



Staff Report of the
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

AMENDMENTS
TO
THE WATER QUALITY CONTROL PLAN FOR
THE SACRAMENTO RIVER AND
SAN JOAQUIN RIVER BASINS

FOR
THE CONTROL OF SALT AND BORON DISCHARGES
INTO THE SAN JOAQUIN RIVER



September 2003
Peer Review Draft

State of California
California Environmental Protection Agency
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

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Basin Plan Amendment Staff Report for the San Joaquin River Salt and Boron TMDL and Program of Implementation

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List of Acronyms and Abbreviations

§	Section (as in a law or regulation)
§§	Sections (as in a law or regulation, plural)
Basin Plan	Water Quality Control Plan (Basin Plan) Central Valley Region ; Sacramento River and San Joaquin River Basins
Calwater Group	Interagency California Mapping Committee
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CVRWQCB	California Regional Water Quality Control Board, Central Valley Region
CWA	Federal Clean Water Act
DWR	California Department of Water Resources
et seq.	“and following” (references a series of related sections of law)
Ibid.	“ibidem” (same citation or reference as the immediately preceding citation or reference)
JPA	Joint Exercise of Powers Authority
LSJR	Lower San Joaquin River
NHI	Natural Heritage Institute
No.	Number
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	Non point Source
p./ pp.	Page/ pages
pers. comm.	personal communication (either written or oral)
Porter-Cologne or Porter-Cologne Act	Porter-Cologne Water Quality Control Act as amended
PY	Personnel Year
Regional Board	California Regional Water Quality Control Board, Central Valley Region
ROWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control Board
SJR	San Joaquin River
SLDMWA	San Luis & Delta-Mendota Water Authority
State Water Board or SWRCB	California State Water Resources Control Board
TAF	Thousand Acre Feet
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Water Code or Wat. Code	California Water Code
WDRs	Waste Discharge Requirements
WQO	Water Quality Objective
WY	Water Year

1 Executive Summary and Background

1.1 Executive Summary

This report provides the technical and policy foundation for a proposed amendment to the water quality control plan (Basin Plan) for the Sacramento River and San Joaquin River Basins. The amendment is intended to implement a Total Maximum Daily Load (TMDL) for Salt and Boron in the Lower San Joaquin River (LSJR). A technical TMDL report has been developed that sets waste load allocations for point sources and load allocations for nonpoint sources. These allocations have been designed to meet existing salt and boron water quality objectives for the LSJR at the Airport Way Bridge near Vernalis. The technical TMDL report for salt and boron in the LSJR is included as Appendix 1.

California Water Code Section 13240 authorizes the Regional Boards to formulate and adopt water quality control plans for all areas within their region. A Basin Plan is the basis for regulatory actions taken for water quality control. The Basin Plan is also used to satisfy parts of Section 303 of the Federal Clean Water Act (CWA) (USEPA, 2002), which requires states to adopt water quality standards. Basin Plans are adopted and amended by the Regional Board through a structured process involving full public participation and state environmental review. Basin Plan amendments do not become effective until approved by the State Water Resources Control Board (State Water Board). U.S. Environmental Protection Agency (USEPA) approval is required for Basin Plan amendments that affect surface water quality standards. Though this Basin Plan amendment does not propose any changes or modification to the existing water quality standards, it does propose implementation of TMDL, which also requires USEPA approval. A Basin Plan must consist of the following (Water Code Section 13050):

- 1) beneficial uses to be protected
- 2) water quality objectives
- 3) a program of implementation needed for achieving water quality objectives

This proposed Basin Plan amendment focuses on achieving existing salinity and boron water quality objectives for the San Joaquin River at the Airport Way Bridge near Vernalis by establishing a control program for salt and boron discharges to the LSJR. Non-point source dischargers can comply with proposed control program by meeting any one of the following conditions:

- a. cease discharge
- b. discharge does not exceed 315 μ S/cm electrical conductivity
- c. operate under waste discharge requirements that include effluent limits for salt
- d. operate under a waiver of waste discharge requirements for salt and boron discharges to the LSJR

Adoption of the proposed Basin Plan amendment will result in the establishment of:

- Fixed load allocations applicable to non point source dischargers regulated under waste discharge requirements
- A method for calculating real-time assimilative capacity and associated real-time salt load limits (available load) based on real-time flow conditions (applicable to dischargers regulated under a waiver of waste discharge requirements)
- A method for apportioning load allocations to non point source dischargers
- A method for calculating waste load allocations for point source dischargers
- Prioritization, by subarea, for implementing load allocations
- A time schedule, prioritized by subarea, for achieving compliance with waste load allocations and load allocations
- A method for calculating load allocations for the salts imported to the LSJR basin by the Delta Mendota Canal of the Central Valley Project.

1.2 Need for a Revision to the Basin Plan

In the 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary* (Bay Delta Plan), the State Water Board adopted the existing salinity water quality objectives (WQOs) for the San Joaquin River at the Airport Way Bridge near Vernalis. In 1999, the State Water Board adopted Water Right Decision 1641, which, in part, implements the salinity standards contained in the 1995 Bay Delta Plan. The 1995 (Bay Delta Plan) and Decision 1641 directed the Central Valley Regional Water Quality Control Board to:

- 1) continue its salt load reduction program, initiated in response to adoption of the 1995 Bay Delta Plan, to reduce annual salt loads to the San Joaquin River by at least 10 percent and to adjust the timing of discharges from low flow to high flow periods
- 2) promptly develop and adopt salinity objectives and a program of implementation for the main stem of the San Joaquin River upstream of Vernalis

Development of a program of implementation to reduce salt loading and to achieve water quality objectives requires revision of the Basin Plan.

Federal law requires establishment of a TMDL for waters not attaining standards. The lower San Joaquin River is currently identified as not attaining standards for salt and boron, necessitating development of a TMDL. Though other methods may be available, a TMDL with both point and nonpoint sources may, in general, only be established by revising the Basin Plan.

A technical TMDL report for salt and boron in the LSJR was developed in January 2002; it contains all of the required elements of a TMDL, including; (1) a problem statement that describes the water body being addressed and reasons for impairment; (2) numeric targets that set quantifiable end-points that the TMDL seeks to achieve; (3) a source analysis that identifies and describes the significant sources of pollutant loading to the

LSJR; (4) loading capacity of the water body; and (5) allocation of loads (Oppenheimer and Grober, et. al., 2002). An updated version of this TMDL report is included in this staff report as Appendix 1.

1.3 Background

The LSJR is on California's CWA Section 303(d) list of impaired waters due to elevated concentrations of salt and boron. The CWA requires states to develop TMDLs for all impaired waters. Since the 1940s, mean annual salt concentrations in the LSJR at the Airport Way Bridge near Vernalis have doubled and boron levels have increased significantly. Water quality monitoring data collected by the Regional Board and others indicates that WQOs for salinity and boron are frequently exceeded in the LSJR during certain times of the year and under certain flow regimes. Water quality data collected during water years 1986 to 1998 indicates that the non-irrigation season salinity objective of 1,000 $\mu\text{S}/\text{cm}$ (applies 1 Sep.- 31 Mar.), was exceeded 11 percent of the time and the irrigation season salinity objective of 700 $\mu\text{S}/\text{cm}$ (applies 1 Apr.- 31 Aug.) was exceeded 49 percent of the time at the Airport Way Bridge Near Vernalis. Consequently, the river does not fully support all of its designated beneficial uses.

The salt and boron water quality impairment in the LSJR has occurred, in large part, as a result of large-scale water development coupled with extensive agricultural land use and associated agricultural discharges in the watershed. LSJR flows have been severely diminished by the construction and operation of dams and diversions and the resulting consumptive use of water. Most of the natural flows from the Upper San Joaquin River (SJR) and its headwaters are diverted at the Friant Dam via the Friant-Kern Canal to irrigate crops outside the SJR Basin. Diverted natural river flows have been replaced with poorer quality (higher salinity) imported water from the Sacramento-San Joaquin Delta (Delta) that is primarily used to irrigate crops on the west side of the LSJR basin. Surface and subsurface agricultural discharges are the largest sources of salt and boron loading to the LSJR; and river water quality is therefore heavily influenced by irrigation return flows during the irrigation season. Water quality generally improves downstream as higher quality flows from the Merced, Tuolumne, and Stanislaus Rivers dilute salt and boron concentrations in the main stem of the LSJR.

1.3.1 Watershed setting

The SJR watershed is bordered by the Sierra Nevada Mountains on the east, the Coast Range on the west, the Delta to the north, and the Tulare Lake Basin to the south. From its source in the Sierra Nevada Mountains, the San Joaquin River flows southwesterly until it reaches Friant Dam. Below Friant Dam, the SJR flows westerly to the center of the San Joaquin Valley near Mendota, where it turns northwesterly to eventually join the Sacramento River in the Delta. The main stem of the entire SJR is about 300 miles long and drains approximately 13,500 square miles.

The major tributaries to the San Joaquin River upstream of the Airport Way Bridge near Vernalis (the boundary of Delta) are on the east side of the San Joaquin Valley, with drainage basins in the Sierra Nevada Mountains. These major east side tributaries are the

Stanislaus, Tuolumne, and Merced Rivers. The Consumnes, Mokelumne, and Calaveras Rivers flow into the San Joaquin River downstream of the Airport Way Bridge near Vernalis. Several smaller, ephemeral streams flow into the SJR from the west side of the valley. These streams include Hospital, Ingram, Del Puerto, Orestimba, Panoche, and Los Banos Creeks. All have drainage basins in the Coast Range, flow intermittently, and contribute sparsely to water supplies. Mud Slough (north) and Salt Slough also drain the Grassland Watershed on the west side of San Joaquin Valley. During the irrigation season, surface and subsurface agricultural return flows contribute greatly to these west side creeks and sloughs.

1.3.2 Project Area

The geographic scope of the salt and boron TMDL and this Basin Plan amendment is limited to a 130-mile reach of the SJR extending from downstream of the Mendota Dam to the Airport Way Bridge near Vernalis (Figure 1-1). The LSJR watershed is defined as the area draining to the San Joaquin River downstream of the Mendota Dam and upstream of Vernalis. For basin planning purposes, the LSJR watershed excludes areas upstream of dams on the major Eastside reservoirs: New Don Pedro, New Melones, Lake McClure, and similar Eastside reservoirs in the LSJR system. The southeastern boundary of the TMDL project area is formed by the LSJR (from the Friant Dam to the Mendota pool). The LSJR Watershed, as defined here, drains approximately 2.9 million acres, which includes approximately 1.4 million acres of agricultural land use.

More information on the project area is contained in Appendix 1, a Regional Board staff report entitled *A Total Maximum Daily Load for Salinity and Boron in the Lower San Joaquin River*.

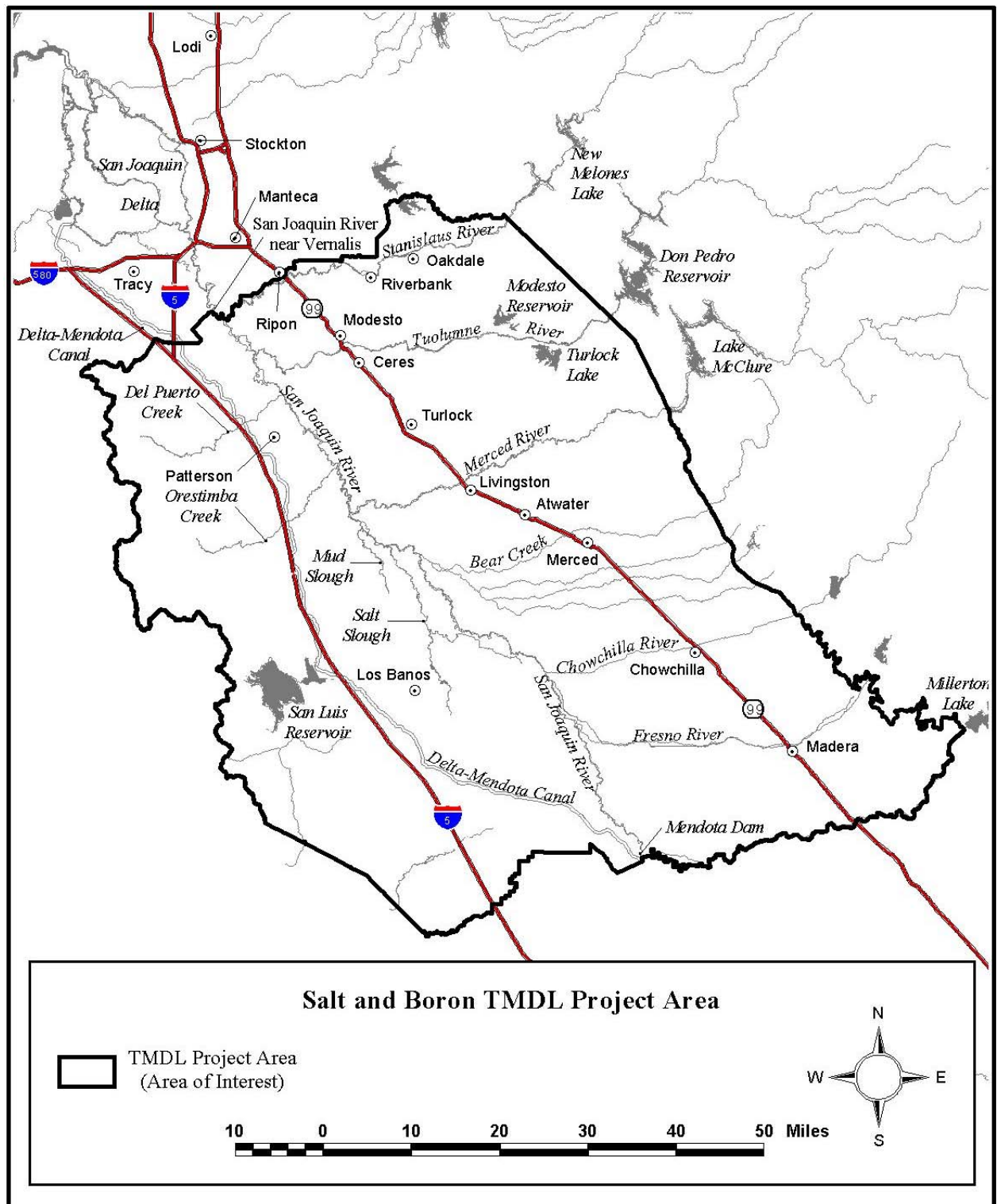


Figure 1-1. Lower San Joaquin River Watershed

1.4 Organization of the Basin Plan Amendment Staff Report

The Basin Plan Amendment staff report is organized into the following sections. The introduction in Section 1 is followed by proposed changes to the Basin Plan in Section 2. A review of the existing policies that pertain to this Basin Plan amendment are contained in Section 3, and an evaluation of the proposed changes to each of the Basin Plan chapters is contained in Section 4.

Water code section 13141 requires that prior to implementation of any agricultural water quality control program, an estimate of the total cost of such program and identification of sources of funding be indicated in the Basin Plan. Additionally, water code section 13241 requires consideration of economics for adoption of new WQOs. The required economic analysis is included in Appendix 4 and summarized in Section 5.

Since the Basin Plan amendment process is a certified regulatory program pursuant to the California Environmental Quality Act (CEQA), the Basin Plan amendment staff report must serve as a substitute Environmental Document (Environmental Impact Report or Negative Declaration). Accordingly, a CEQA review is contained in Section 6, and a description of public participation is contained in section 7.

2 Organization of the Proposed Basin Plan Amendment

The proposed Basin Plan amendment consists of additions and modifications to two chapters of the current Basin Plan. Proposed amendment language is contained in section 2.1 of this staff report. Attachment A contains a draft Regional Board resolution to adopt the proposed Basin Plan amendment. Following is a description of the proposed amendments to the Basin Plan in the order in which they are presented in the Basin Plan.

Proposed Changes to Basin Plan Chapter I: Introduction

Chapter 1 of the Basin Plan contains, among other things, a description of the major basins and their boundaries. This Basin Plan Amendment proposes to:

- 1) correct an inaccurate description of the planning boundary between the San Joaquin River Basin and the Tulare Lake Basin.
- 2) add a detailed description of the LSJR watershed along and descriptions of several smaller geographic subareas within the LSJR watershed
- 3) revise the description of the Grassland Watershed

The proposed amendment provides a description of the lower San Joaquin River Basin along with descriptions of several smaller geographic areas within this Basin. These smaller geographic areas are referred to as major subareas. In some cases major subareas have been subdivided into minor subareas to allow for increased resolution in identifying pollution sources and increased focus for implementation of regulations and pollution

controls. The existing description of the Grassland Watershed will be deleted and replaced by one of the major subareas. Descriptions of the major and minor subareas listed in Table 2-1 will be added to Chapter 1 of the Basin Plan. Detailed technical descriptions of each sub-areas are proposed for inclusion in a new appendix to the Basin Plan. These Technical descriptions are contained in Appendix C of the Technical TMDL report.

Table 2-1: San Joaquin River Subareas

LOWER SAN JOAQUIN RIVER WATERSHED	Major Subarea		Minor Subarea (subdivisions of major subareas)	
	1	SJR upstream Salt Slough	1a	Bear Creek (effective drainage area)
			1b	Fresno-Chowchilla
	2	Grassland	-----	
	3	East Valley Floor	3a	Northeast Bank
			3b	North Stanislaus
			3c	Stevinson
			3d	Turlock Area
	4	Northwest Side	4a	Greater Orestimba
			4b	Westside Creeks
			4c	Vernalis North
	5	Merced River	-----	
	6	Tuolumne River	-----	
	7	Stanislaus River	-----	

Proposed Changes to Basin Plan Chapter II: Existing and Potential Beneficial Uses

No revisions are proposed.

Proposed Changes to Basin Plan Chapter III: Water Quality Objectives

No revisions are proposed.

Proposed Changes to Basin Plan Chapter IV: Implementation

This revision proposes to append an existing Basin Plan Section titled ‘Agricultural Drainage Discharges in the San Joaquin Basin’ by adding an additional subsection titled ‘Control Program for Salt and Boron Discharges into the Lower San Joaquin River’ beginning on page IV-33.00 of the Basin Plan. The proposed amendment is intended to result in long-term achievement of the existing salt and boron WQOs in the LSJR at the Airport Way Bridge near Vernalis by establishing salinity waste load allocations for point sources and salinity load allocations for non-point sources. Attainment of salt load allocations are expected to result in achievement of the existing boron water quality objective at Vernalis, therefore, explicit boron allocations are not needed nor are they proposed.

Non-point source dischargers can comply with proposed control program by meeting any one of the following conditions:

- a. cease discharge

- b. discharge does not exceed 315µS/cm electrical conductivity
- c. operate under waste discharge requirements that include effluent limits for salt
- d. operate under a waiver of waste discharge requirements for salt and boron discharges to the LSJR

Dischargers operating under waste discharge requirements are required to meet fixed monthly base load allocations specified as effluent limits and dischargers operating under a waiver of waste discharge requirements are required to participate in a Regional Board approved real-time management program and to meet real-time salt load allocations. The actual fixed monthly base load allocations and the method use to calculate real-time load allocations are specified in Table IV-7 of the proposed Basin Plan Amendment. Waste load allocations for point sources discharges are concentration based and set equal to the existing water quality objectives for the LSJR at the Airport way Bridge near Vernalis. The proposed amendment includes a method used to prioritize implementation of the control program by geographic subarea and type of discharge. Priorities for implementation are then tied to a schedule for compliance that ranges from 8-12 years for high priority subareas and 16-20 years for low priority subareas.

A discussion of the costs associated with the proposed salt and boron control program and the potential funding sources will be added to an existing Basin Plan section titled 'Estimated Costs of Agricultural Water Quality Control Programs and Potential Funding Sources'.

Basin Plan Chapter V: Surveillance and monitoring

No revisions are proposed

2.1 Proposed Amendments to the Basin Plan

Following are experts from Basin Plan Chapters I and IV shown similar to how they will appear after the proposed amendment is adopted. Deletions are indicated as strike-through text (~~deleted text~~) and additions are shown as underlined text (added text). All capitalized italics text is included as added notation (*NOTATION TEXT*) and will not appear in the Basin Plan. All other text changes are shown accurately, however, formatting and pagination will change.

INTRODUCTION

BASIN DESCRIPTION

This Basin Plan covers the entire area included in the Sacramento and San Joaquin River drainage basins (see maps in pocket* and Figure II-1). The basins are bound by the crests of the Sierra Nevada on the east and the Coast Range and Klamath Mountains on the west. They extend some 400 miles from the California - Oregon border southward to the headwaters of the San Joaquin River.

*NOTE: The planning boundary between the San Joaquin River Basin and the Tulare Lake Basin follows ~~the northern boundary of the Little Panoche Creek basin~~ the southern watershed boundaries of the Little Panoche Creek, Moreno Gulch, and Capita Canyon to boundary of the Westlands Water District. From here, the boundary follows the northern edge of the Westlands Water District until its intersection with the Firebaugh Canal Company's Main Lift Canal. The basin boundary then follows the Main Lift Canal to the Mendota Pool and continues eastward along the channel of the San Joaquin River to Millerton Lake in the Sierra Nevada foothills, and then follows along the southern boundary of the San Joaquin River drainage basin.

The Sacramento River and San Joaquin River Basins cover about one fourth of the total area of the State and over 30% of the State's irrigable land. The Sacramento and San Joaquin Rivers furnish roughly 51% of the State's water supply. Surface water from the two drainage basins meet and form the Delta, which ultimately drains to San Francisco Bay. Two major water projects, the Federal Central Valley Project and the State Water Project, deliver water from the Delta to Southern California, the San Joaquin Valley, Tulare Lake Basin, the San Francisco Bay area, as well as within the Delta boundaries.

The Delta is a maze of river channels and diked islands covering roughly 1,150 square miles, including 78 square miles of water area. The legal boundary of the Delta is described in Section 12220 of the Water Code (also see Figure III-1 of this Basin Plan).

Ground water is defined as subsurface water that occurs beneath the ground surface in fully saturated zones within soils and other geologic formations. Where ground water occurs in a saturated geologic unit that contains sufficient permeability and thickness to yield significant quantities of water to wells or springs, it can be defined as an aquifer (USGS, Water Supply Paper

1988, 1972). A ground water basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers (Todd, *Groundwater Hydrology*, 1980).

Major ground water basins underlie both valley floors, and there are scattered smaller basins in the foothill areas and mountain valleys. In many parts of the Region, usable ground waters occur outside of these currently identified basins. There are water-bearing geologic units within ground water basins in the Region that do not meet the definition of an aquifer. Therefore, for basin planning and regulatory purposes, the term "ground water" includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations, whether or not these waters meet the definition of an aquifer or occur within identified ground water basins.

Sacramento River Basin

The Sacramento River Basin covers 27,210 square miles and includes the entire area drained by the Sacramento River. For planning purposes, this includes all watersheds tributary to the Sacramento River that are north of the Cosumnes River watershed. It also includes the closed basin of Goose Lake and drainage sub-basins of Cache and Putah Creeks.

The principal streams are the Sacramento River and its larger tributaries: the Pit, Feather, Yuba, Bear, and American Rivers to the east; and Cottonwood, Stony, Cache, and Putah Creeks to the west. Major reservoirs and lakes include Shasta, Oroville, Folsom, Clear Lake, and Lake Berryessa.

DWR Bulletin 118-80 identifies 63 ground water basins in the Sacramento watershed area. The Sacramento Valley floor is divided into 2 ground water basins. Other basins are in the foothills or mountain valleys. There are areas other than those identified in the DWR Bulletin with ground waters that have beneficial uses.

San Joaquin River Basin

The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the

Sacramento River and south of the American River watershed. The southern planning boundary is described in the first paragraph of the previous page.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

DWR Bulletin 118-80 identifies 39 ground water basins in the San Joaquin watershed area. The San Joaquin Valley floor is divided into 15 separate ground water basins, largely based on political considerations. Other basins are in the foothills or mountain valleys. There are areas other than those identified in the DWR Bulletin with ground waters that have beneficial uses.

Grassland Watershed

The Grassland watershed is a valley floor sub-basin of the San Joaquin River Basin. The portion of the watershed for which agricultural subsurface drainage policies and regulations apply covers an area of approximately 370,000 acres and is bounded on the north by the alluvial fan of Orestimba Creek and by the Tulare Lake Basin to the south. The San Joaquin River forms the eastern boundary and Interstate Highway 5 forms the approximate western boundary. The San Joaquin River forms a wide flood plain in the region of the Grassland watershed.

The hydrology of the watershed has been irreversibly altered due to water projects and is presently governed by land uses. These uses are primarily, managed wetlands and agriculture. The wetlands form important waterfowl habitat for migratory waterfowl using the Pacific Flyway. The alluvial fans of the western and southern portions of the watershed contain salts and selenium which can be mobilized through irrigation practices and can impact beneficial uses of surface waters and wetlands if not properly regulated.

Lower San Joaquin River Watershed and Subareas

Technical descriptions of the Lower San Joaquin River (LSJR) and its component subareas are contained in Appendix 41. General descriptions follow: The LSJR watershed encompasses approximately 4,600 square miles in Merced County and portions of Fresno, Madera, San Joaquin, and Stanislaus counties. For planning purposes, the LSJR watershed is defined as the area draining to the San Joaquin River downstream

of the Mendota Dam and upstream of Vernalis, excluding the areas upstream of dams on the major Eastside reservoirs: New Don Pedro, New Melones, Lake McClure, and similar Eastside reservoirs in the LSJR system. The LSJR watershed excludes all lands within Calaveras, Tuolumne, and Mariposa Counties. The LSJR watershed has been subdivided into seven major sub areas. In some cases major subareas have been further subdivided into minor subareas to facilitate more effective and focused water quality planning (Table I-1).

Table I-1 Lower San Joaquin River Subareas

Major Subareas		Minor Subareas	
1	SJLR upstream Salt Slough	1a	Bear Creek
		1b	Fresno-Chowchilla
2	Grassland	-- --	
3	East Valley Floor	3a	Northeast Bank
		3b	North Stanislaus
		3c	Stevinson
		3d	Turlock Area
4	Northwest Side	4a	Greater Orestimba
		4b	Westside Creeks
		4c	Vernalis North
5	Merced River	-- --	
6	Tuolumne River	-- --	
7	Stanislaus River	-- --	

1. Lower San Joaquin River upstream Salt Slough

This sub-area drains approximately 1,470 square miles on the east side of the LSJR upstream of the Salt Slough confluence. The sub-area includes the portions of the Bear Creek, Chowchilla River and Fresno River watersheds that are contained within Merced and Madera Counties. The northern boundary of the sub-area generally coincides with the Merced River Watershed. The western and southern boundaries follow the San Joaquin River from the Lander Avenue bridge to Friant, except for the lands within the Columbia Canal Company, which are excluded. Columbia Canal Company lands are included in the Grassland Sub-area.

1a. Bear Creek (effective drainage area)

This minor subarea is a 520 square mile subset of lands within the LSJR upstream of Salt Slough Sub-area. The Bear Creek Minor Subarea is predominantly comprised of the portion of the Bear Creek Watershed that is contained within Merced County.

1b. Fresno-Chowchilla

The Fresno-Chowchilla Minor Subarea is comprised of approximately 950 square miles of

land within the southern portion of the LSJR upstream of Salt Slough Subarea. This minor subarea is located in southeastern Merced County and western Madera County and contains the land area that drains into the LSJR between Sack Dam and the Bear Creek confluence, including the drainages of the Fresno and Chowchilla Rivers.

2. Grassland

The Grassland Sub-area drains approximately 1,400 square miles on the west side of the LSJR in portions of Merced, Stanislaus, and Fresno Counties. This sub-area includes the Mud Slough, Salt Slough, and Los Banos Creek watersheds. The western boundary of this subarea is generally formed by the LSJR between the Merced River confluence and the Mendota Dam. The Grassland Sub-area extends across the LSJR, into the east side of the San Joaquin Valley, to include the lands within the Columbia Canal Company. The eastern boundary of the sub-area generally follows the crest of the Coast Range with the exception of lands within San Benito County, which are excluded. For purposes of control programs in this Basin Plan, the Grassland Subarea is alternately called the Grassland Watershed.

3. East Valley Floor

This sub-area includes approximately 412 square miles of land on the east side of the LSJR that drains directly to the LSJR between Vernalis and the Salt Slough confluence. The sub-area is largely comprised of the land in between the major east-side drainages of the Tuolumne, Stanislaus, and Merced Rivers. This sub-area lies within central Stanislaus County and north-central Merced County. Numerous drainage canals, including the Harding Drain and natural drainages, drain this sub-area.

3a. Northeast Bank

This minor subarea of the East Valley Floor contains all of the land draining into the east side San Joaquin River between the Maze Boulevard Bridge and the Crows Landing Road Bridge. The Northeast Bank covers approximately 120 square miles in central Stanislaus County.

3b. North Stanislaus

The North Stanislaus minor subarea is a subset of lands within the East Valley Floor Subarea. This minor subarea drains approximately 68 square miles of land between the Stanislaus and Tuolumne River watersheds that flows into the San Joaquin River between the Airport Road Bridge near Vernalis and the Maze Boulevard Bridge.

3c. Stevinson

This minor subarea of the East Valley Floor contains all of the land draining to the LSJR between the Merced River confluence and the Lander Avenue (Highway 165) Bridge. The Stevinson Minor Subarea occupies approximately 44 square miles in north-central Merced County.

3d. Turlock Area

This minor subarea of the East Valley Floor contains all of the land draining to the LSJR between the Crows Landing Road Bridge and the Merced River confluence. The Turlock Area Minor Subarea occupies approximately 180 square miles in south-central Stanislaus County and northern Merced County.

4. Northwest Side

This 609 square mile area generally includes the lands on the West side of the LSJR between the Airport Road Bridge near Vernalis and the Merced River confluence. This sub-area includes the entire drainage area of Orestimba, Del Puerto, and Hospital/Ingram Creeks. The eastern Boundary of the sub-area follows the LSJR from Vernalis to the Merced River confluence and the western boundary follows the crest of the Coast Range. The sub-area is primarily located in Western Stanislaus County except for a small area that extends into Merced County near the town of Gustine and the Central California Irrigation District Main Canal.

4a. Greater Orestimba

The Greater Orestimba Minor Subarea is a 300 square mile subset of the Northwest Side Subarea located in southwest Stanislaus County and a small portion of western Merced County. It contains the entire Orestimba Creek watershed and the remaining area that drains into the LSJR from the west between the Crows Landing Road Bridge and the confluence of the Merced River.

4b. Westside Creeks

This Minor Subarea is comprised of 300 square miles of the Northwest Side Subarea in western Stanislaus County. It consists of the areas that drain into the west side of the San Joaquin River between Maze Boulevard and Crows Landing Road, including the drainages of Del Puerto, Hospital, and Ingram Creeks.

4c. Vernalis North

The Vernalis North Minor Subarea is a 9 square mile subset of land within the most northern portion of the Northwest Side Subarea. It contains the land draining to the San Joaquin River from the west between the Maze Boulevard Bridge and the Airport Road Bridge near Vernalis.

5. Merced River

This 290 square mile subarea is comprised of the Merced River watershed downstream of the Merced-Mariposa county line and upstream of the River Road Bridge. The Merced River subarea includes a 13-square-mile “island” of land (located between the East Valley Floor and the Tuolumne River Subareas) that is hydrologically connected to the Merced River by the Highline Canal.

6. Tuolumne River

This 300 square mile subarea is comprised of the Tuolumne River watershed downstream of the Stanislaus-Tuolumne county line, including the drainage of Turlock Lake, and upstream of the Shiloh Road Bridge.

7. Stanislaus River

This 150 square mile subarea is comprised of the Stanislaus River watershed downstream of the Stanislaus-Calaveras county line and upstream of Caswell State Park.

SKIP TO CHAPTER IV: IMPLEMENTATION

CONTINUOUS PLANNING FOR IMPLEMENTATION OF WATER QUALITY CONTROL

In order to effectively protect beneficial uses, the Regional Water Board updates the Basin Plan regularly in response to changing water quality conditions. The Regional Water Board is periodically apprised of water quality problems in the Sacramento and San Joaquin River Basins, but the major review of water quality is done every three years as part of the Triennial Review of water quality standards.

During the triennial review, the Regional Water Board holds a public hearing to receive comments on actual and potential water quality problems. A workplan is prepared which identifies the control actions that will be implemented over the succeeding three years to address the problems. The actions may include or result in revision of the Basin Plan's water quality standards if that is an appropriate problem remedy. Until such time that a basin plan is revised, the triennial review also serves to reaffirm existing standards.

The control actions that are identified through the triennial review process are incorporated into the Basin Plan to meet requirements to describe actions (to achieve objectives) and a time schedule of their implementation as called for in the Water Code, Section 13242(a) and (b). The actions recommended in the most recent triennial review are described in the following section.

ACTIONS AND SCHEDULE TO ACHIEVE WATER QUALITY OBJECTIVES

The Regional Water Board expects to implement the actions identified below over the fiscal year (FY) period 1993/1994 through 1995/1996. The problems to which the actions respond were identified as a result of the Regional Water Board's 1993 Triennial Review. The actions and schedules assume that the Regional Water Board has available a close approximation of the mix and level of resources it had in FY 1993/1994. The actions are identified by major water quality problem categories.

Agricultural Drainage Discharges in the San Joaquin River Basin

Water quality in the San Joaquin River has degraded significantly since the late 1940s. During this period, salt concentrations in the River, near Vernalis, have doubled. Concentrations of boron, selenium, molybdenum and other trace elements have also increased. These increases are primarily due to reservoir development on the east side tributaries and upper basin for agricultural development, the use of poorer quality, higher salinity, Delta water in lieu of San Joaquin River water on west side agricultural lands and drainage from upslope saline soils on the west side of the San Joaquin Valley. Point source discharges to surface waters only contribute a small fraction of the total salt and boron loads in the San Joaquin River.

The water quality degradation in the River was identified in the 1975 Basin Plan and the Lower San Joaquin River was classified as a Water Quality Limited Segment. At that time, it was envisioned that a Valley-wide Drain would be developed and these subsurface drainage water flows would then be discharged outside the Basin, thus improving River water quality. However, present day development is looking more toward a regional solution to the drainage water discharge problem rather than a valley-wide drain.

Because of the need to manage salt and other pollutants in the River, the Regional Water Board began developing a Regional Drainage Water Disposal Plan for the Basin. The development began in FY 87/88 when Basin Plan amendments were considered by the Water Board in FY 88/89. The amendment development process included review of beneficial uses, establishment of water quality objectives, and preparation of a regulatory plan, including a full implementation plan. The regulatory plan emphasized achieving objectives through reductions in drainage volumes and pollutant loads through best management practices and other on-farm methods. ~~Additional regulatory steps will be considered based on achievements of water quality goals and securing of adequate resources.~~

The 88/89 amendment emphasized toxic elements in subsurface drainage discharges. The Regional Water Board however still recognizes salt management as the most serious long-term issue on the San Joaquin River. Salinity impairment in the San Joaquin River remains a persistent problem as salinity water quality objectives continue to be exceeded. The Regional Board adopted the following control program for salt and boron in the San Joaquin River to address salt and boron impairment and to bring the river into compliance with water quality objectives. Salinity impairment in the San Joaquin River remains a persistent problem as salinity

water quality objectives continue to be exceeded. The Regional Board adopted the following control program for salt and boron in the San Joaquin River to address salt and boron impairment and to bring the river into compliance with water quality objectives. Additionally, The Regional Water Board will continue as an active participant in the San Joaquin River Management Program implementation phase, as authorized by AB 3048, to promote salinity management schemes including timed discharge releases, real time monitoring and source control.

Control program for subsurface agricultural drainage discharges into the San Joaquin River

Per the amendment to the Basin Plan for San Joaquin River subsurface agricultural drainage, approved by the State Water Board in Resolution No. 96-078 and incorporated herein, the following actions will be implemented.

1. In developing control actions for selenium, the Regional Board will utilize a priority system which focuses on a combination of sensitivity of the beneficial use to selenium and the environmental benefit expected from the action.
2. Control actions which result in selenium load reduction are most effective in meeting water quality objectives.
3. With the uncertainty in the effectiveness of each control action, the regulatory program will be conducted as a series of short-term actions that are designed to meet long-term water quality objectives.
4. Best management practices, such as water conservation measures, are applicable to the control of agricultural subsurface drainage.
5. Performance goals will be used to measure progress toward achievement of water quality objectives for selenium. Prohibitions of discharge and waste discharge requirements will be used to control agricultural subsurface drainage discharges containing selenium. Compliance with performance goals and water quality objectives for nonpoint sources will occur no later than the dates specified in Table IV-4.
6. Waste discharge requirements will be used to control agricultural subsurface drainage discharges containing selenium and may be used to control discharges containing other toxic trace elements.

7. Selenium load reduction requirements will be incorporated into waste discharge requirements as effluent limits as necessary to ensure that the selenium water quality objectives in the San Joaquin River downstream of the Merced River inflow is achieved. The Board intends to implement a TMDL after public review.

Table IV-4. Compliance Time Schedule for Meeting the 4-day Average and Monthly Mean Water Quality Objective for Selenium

Selenium Water Quality Objectives (in bold) and Performance Goals (in italics)

Water Body/Water Year Type ¹	1 October 1996	1 October 2002	1 October 2005	1 October 2010
Salt Slough and Wetland Water Supply Channels listed in Appendix 40	2 µg/L monthly mean			
San Joaquin River below the Merced River; Above Normal and Wet Water Year types ¹		<i>5 µg/L monthly mean</i>	5 µg/L 4-day avg.	
San Joaquin River below the Merced River; Critical, Dry, and Below Normal Water Year types		<i>8 µg/L monthly mean</i>	<i>5 µg/L monthly mean</i>	5 µg/L 4-day avg.
Mud Slough (north) and the San Joaquin River from Sack Dam to the Merced River				5 µg/L 4-day avg.

¹ The water year classification will be established using the best available estimate of the 60-20-20 San Joaquin Valley water year hydrologic classification (as defined in Footnote 17 for Table 3 in the State Water Resources Control Board's *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, May 1995) at the 75% exceedance level using data from the Department of Water Resources Bulletin 120 series. The previous water year's classification will apply until an estimate is made of the current water year.

- Selenium effluent limits established in waste discharge requirements will be applied to the discharge of subsurface drainage water from the Grassland watershed. In the absence of a regional entity to coordinate actions on the discharge, the Regional Board will consider setting the effluent limits at each drainage water source (discharger) to ensure that beneficial uses are protected at all points downstream.

- Upslope irrigations and water facility operators whose actions contribute to subsurface drainage flows will participate in the program to control discharges.
- Public and private managed-wetlands will participate in the program to achieve water quality objectives.
- Achieving reductions in the load of selenium discharged is highly dependent upon the effectiveness of individual actions or technology not currently available; therefore, the Regional Board will review the waste discharge requirements and compliance schedule at least every 5 years.
- All those discharging or contributing to the generation of agricultural subsurface drainage will be required to submit for approval a short-term (5-year) drainage management plan designed to meet interim milestones and a long-term drainage management plan designed to meet final water quality objectives.
- An annual review of the effectiveness of control actions taken will be conducted by those contributing to the generation of agricultural subsurface drainage.
- Evaporation basins in the San Joaquin Basin will be required to meet minimum design standards, have waste discharge requirements and be part of a regional plan to control agricultural subsurface drainage.
- The Regional Board staff will coordinate with US EPA and the dischargers on a study plan to support the development of a site specific selenium water quality objective for the San Joaquin River and other effluent dominated waterbodies in the Grassland watershed.
- The Regional Board will establish water quality objectives for salinity for the San Joaquin River.

Control program for salt and boron discharges into the lower San Joaquin River

The goal of the salt and boron control program is to achieve compliance with salt and boron water quality objectives without restricting the ability of dischargers to export salt out of the San Joaquin River basin.

For the purpose of this control program, non-point source land uses include all irrigated lands and non-point source discharges are discharges from irrigated lands.

Irrigated lands are lands where water is applied for producing crops and, for the purpose of this control program, includes, but is not limited to, land planted to row, field and tree crops as well as commercial nurseries, nursery stock production, managed wetlands, and rice production.

Per the amendment to the Basin Plan for control of salt and boron discharges into the lower San Joaquin River (LSJR) basin, approved by the Regional Board in Resolution No. 2003-xx and incorporated herein, the following actions will be implemented.

1. The salt and boron control program establishes salt load limits to achieve compliance with salt and boron water quality objectives for the LSJR at the Airport Way Bridge near Vernalis.
2. Control actions that result in salt load reductions will be effective in the control of boron.
3. The Regional Board establishes a method for determining the maximum allowable salt loading to the LSJR. Load allocations are established for non-point sources and waste load allocations are established for point sources.
4. Load allocations to specific dischargers or groups of dischargers are proportionate to the area of non-point source land use contributing to the discharge. The Regional Board shall use waivers of waste discharge requirements or waste discharge requirements to apportion load allocations to each of the following seven geographic sub-areas that comprise the LSJR:
 - a) San Joaquin River Upstream of Salt Slough
 - b) Grassland
 - c) Northwest Side
 - d) East Valley Floor
 - e) Merced River
 - f) Tuolumne River

g) Stanislaus River

These sub-areas are described in Chapter 1 and in more detail in Appendix 41.

6. Dischargers of irrigation return flows from irrigated lands are in compliance with this control program if they meet any of the following conditions:
 - a. Cease discharge
 - b. Discharge does not exceed 315µS/cm electrical conductivity
 - c. Operate under waste discharge requirements that include effluent limits for salt
 - d. Operate under a waiver of waste discharge requirements for salt and boron discharges to the LSJR
7. Dischargers operating under waste discharge requirements are required to meet fixed monthly base load allocations specified as effluent limits.
8. Dischargers operating under a waiver of waste discharge requirements are required to participate in a Regional Board approved real-time management program and to meet real-time salt load allocations.
9. Fixed monthly base load allocations and the method use to calculate real-time load allocations are specified in Table IV-7.
10. Waste Load Allocations are established for point sources of salt in the basin.

NPDES permitted discharges will not exceed the salt and boron water quality objectives established for the LSJR at the Airport Way Bridge near Vernalis.
11. Supply water credits are granted to irrigators that receive supply water from the Delta Mendota Canal (DMC) or the LSJR between the confluence of the Merced River and the Airport Way Bridge near Vernalis.
12. Supply water Load Allocations are established for salts in irrigation water imported to the LSJR Watershed from the Sacramento/San Joaquin River Delta.

The Regional Board will attempt to enter into a Management Agency Agreement (MAA) between

the State Water Resources Control Board, the Regional Board, and the U.S. Bureau of Reclamation to address salt imports from the DMC to the LSJR watershed. The MAA shall include provisions requiring the U.S. Bureau of Reclamation to:

- a. Meet DMC load allocations; or
- b. Provide mitigation and/or dilution flows to create additional assimilative capacity for salt in the LSJR equivalent to DMC salt loads in excess of their allocation

The Regional Board shall request a report of waste discharge from the U.S. Bureau of Reclamation to address DMC discharges if a MAA is not established within 2 years from the date of adoption of this control program.

13. The Regional Board will review and update the load allocations and waste load allocations every 6 years from the date of adoption of this control program. Changes to load allocations will be implemented through revisions of the applicable waste discharge requirements or waivers of waste discharge requirements. The Regional Board shall authorize such revisions.
14. The Regional Board encourages real-time water quality management and/or pollutant trading of waste load allocations, load allocations, and supply water allocations as a means for attaining salt and boron water quality objectives while maximizing the export of salts out of the LSJR watershed.
15. The established waste load allocations, load allocations, and supply water allocations represent a maximum allowable level. The Regional Board may take other actions or require additional reductions in salt and boron loading to protect beneficial uses.

Implementation Priority

16. The Regional Board will focus control actions on the most significant sources of salt and boron discharges to the LSJR. Priority for implementation of load allocations to control salt and boron discharges will be given to sub-areas with the greatest unit area salt loading (tons per acre per year) to the LSJR (Table IV-5).

The priorities established in Table IV-5 will be reviewed every six years from the effective date of this control program.

Table VI-5: Priorities for implementing load allocations¹

<u>Sub-area</u>	<u>Priority</u>
<u>San Joaquin River Upstream of Salt Slough</u>	<u>Low</u>
<u>Grassland</u>	<u>High</u>
<u>Northwest Side</u>	<u>High</u>
<u>East Valley Floor</u>	<u>Low</u>
<u>Merced River</u>	<u>Low</u>
<u>Tuolumne River</u>	<u>Medium</u>
<u>Stanislaus River</u>	<u>Low</u>
<u>Delta Mendota Canal</u>	<u>High</u>
<i>Priorities based on the unit area salt loading from each sub-area and mass load from the DMC (source: TMDL staff report)</i>	

Time Schedules for Implementation

17. Dischargers regulated under a waiver of waste discharge requirements for dischargers participating in a real-time management program for the control of salt and boron in the LSJR shall file a notice of intent to comply with the waiver conditions within 1 year of the date of adoption of the waiver.
18. Existing point source dischargers subject to a NPDES permit are low priority and subject to the compliance schedules for low priority discharges in Table IV-6. New point source discharges that begin discharging after the date of the adoption of this control program must meet waste load allocations upon the commencement of the discharge.

Table IV-6: Schedule for Compliance with the load allocations for salt and boron discharges into the LSJR

<u>Priority</u>	<u>Year to implement¹</u>	
	<u>Wet through Dry Year Types</u>	<u>Critical Year Types</u>
<u>High</u>	<u>8</u>	<u>12</u>
<u>Medium</u>	<u>12</u>	<u>16</u>
<u>Low</u>	<u>16</u>	<u>20</u>
¹ <u>number of years from the effective date of this control program</u>		

Table IV-7 Base Load Allocations, Real-time Load Allocations, Supply Water Credits, and Supply Water Allocations

BASE LOAD ALLOCATIONS													
<u>Base Load Allocations (thousand tons)</u>													
<u>Year-type</u>	<u>Month / Period</u>												
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr 1 to Apr. 14</u>	<u>Pulse Period ¹</u>	<u>May 16 to May 31</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
<u>Wet</u>	<u>41</u>	<u>84</u>	<u>116</u>	<u>23</u>	<u>72</u>	<u>31</u>	<u>0</u>	<u>0</u>	<u>5</u>	<u>45</u>	<u>98</u>	<u>44</u>	<u>36</u>
<u>Abv. Norm</u>	<u>44</u>	<u>84</u>	<u>64</u>	<u>26</u>	<u>71</u>	<u>14</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>44</u>	<u>58</u>	<u>35</u>	<u>32</u>
<u>Blw. Norm</u>	<u>22</u>	<u>23</u>	<u>31</u>	<u>11</u>	<u>45</u>	<u>8</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>38</u>	<u>41</u>	<u>34</u>	<u>30</u>
<u>Dry</u>	<u>28</u>	<u>39</u>	<u>25</u>	<u>5</u>	<u>25</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>25</u>	<u>31</u>	<u>27</u>	<u>28</u>
<u>Critical</u>	<u>18</u>	<u>15</u>	<u>11</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>19</u>	<u>30</u>	<u>26</u>	<u>23</u>
REAL-TIME LOAD ALLOCATIONS													
Non-point source dischargers operating under waiver of waste discharge requirements must participate in a Regional Board approved real-time management program and meet real-time load allocations. Loading capacity and real-time load allocations are calculated for a monthly time step. The following method is used to calculate real-time load allocations. Flows are expressed in thousand acre-feet per month and loads are expressed in tons per month.													
Loading Capacity (LC) in tons per month is calculated by multiplying flow in acre-ft per month by the salinity water quality objective in $\mu\text{S}/\text{cm}$, a conversion factor of 0.0008293, and a coefficient of 0.85 to provide a 15 percent margin of safety to account for any uncertainty.													
$LC = Q * WQO * 0.0008293 * 0.85$ <p>where:</p> <p>LC = total loading capacity in tons per month</p> <p>Q = flow in the Joaquin River at the Airport way Bridge near Vernalis in thousand acre-feet per month</p> <p>WQO = salinity water quality objective in $\mu\text{S}/\text{cm}$</p>													
The sum of the real-time Load Allocations (LA) for non point source dischargers are equal to a portion of the LSJR's total Loading Capacity (LC) as described by the following equation:													
$LA = LC - L_{BG} - L_{CUA} - L_{GW} - WLA$ <p>Where:</p> <p>LA =sum of the real-time Load Allocations for non-point source dischargers</p> <p>L_{BG} = loading from background sources</p> <p>L_{CUA} =consumptive use allowance</p> <p>L_{GW} = loading from groundwater</p> <p>WLA =waste load allocations for point sources</p>													
Background loading is calculated using the following equation:													
$L_{BG} = Q * 85 \mu\text{S}/\text{cm} * 0.0008293$													

Table IV-7 Base Load Allocations, Real-time Load Allocations, Supply Water Credits, and Supply Water Allocations (continued)

Consumptive use allowance loading is calculated with the following equation:

$$L_{CUA} = Q * 230 \mu\text{S/cm} * 0.0008293$$

Monthly groundwater Loading (L_{GW}) (in tons)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
15	15	30	32	36	53	46	27	16	13	14	15

Waste load allocations for point sources are calculated using the following equation:

$$WLA = Q_{PS} * WQO * 0.0008293$$

where:

WLA = Waste Load Allocation in tons per month

Q_{PS} = Sum of the flow from all NPDES permitted point source discharges to surface waters in thousand acre-feet per month

WQO = water quality objective in $\mu\text{S/cm}$

APPORTIONING OF LOAD ALLOCATION

An individual discharger or group of dischargers can calculate their load allocation by multiplying the non-point source acreage drained by the load allocation per acre.

$$LA \text{ per acre} = \frac{LA}{\text{Total nonpoint source acreage}}$$

As of 1 August 2003, the total non-point source acreage of the LSJR Basin is 1.16-million acres.

Non-point source land uses include all agricultural lands and managed wetlands. Agricultural land includes all areas designated as agricultural or semi-agricultural land uses in the most recent land use surveys published by the California Department of Water Resources. California Department of Water Resources land use surveys are prepared and published on a county-by-county basis. Multiple counties or portions of counties may overlay a given sub-area. The land use surveys must be used in combination with a GIS to quantify the agricultural land use in each subarea. Non-point source land areas will be updated every 6 years if updated California Department of Water Resources land use surveys have been published. The following land use surveys (or portions thereof) are used to quantify agricultural land use in the LSJR watershed.

County	Year of most recent land use survey ¹
Merced	1995
Madera	1995
San Joaquin	1996
Fresno	1994
Stanislaus	1996

¹-as of 1 August 2003

Acreage of managed wetlands is based on the boundaries of the federal, private and state owned wetlands that comprise the Grassland Ecological Area in Merced County. Agricultural lands (as designated in DWR land uses surveys) within the Grassland Ecological Area are counted as a agricultural land use and not as managed wetlands. All other lands within the Grassland Ecological Area are considered to be managed wetlands.

Table IV-7 Base Load Allocations, Real-time Load Allocations, Supply Water Credits, and Supply Water Allocations (continued)

SUPPLY WATER CREDITS													
The DMC supply water credit is equal to 50 percent of the salt load delivered to Grassland and Northwest Side sub-areas. The following fixed DMC supply water credits apply to dischargers regulated under waste discharge requirements:													
DMC supply water credits (thousand tons)													
Year-type	Month / Period												
	Jan	Feb	Mar	Apr 1 to Apr. 14	Pulse Period ¹	May 16 to May 31	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NORTHWEST SIDE SUBAREA													
Wet	0.0	0.2	0.0	0.7	1.4	0.7	2.0	2.6	2.6	1.0	0.9	0.6	0.0
Abv. Norm	0.0	0.0	0.0	0.8	1.9	1.0	2.3	2.3	2.6	1.2	0.8	0.3	0.0
Blw. Norm	0.0	0.0	0.0	1.0	2.6	1.5	3.4	4.2	3.3	2.5	1.9	0.8	0.0
Dry	0.0	0.0	0.0	0.1	0.3	0.2	0.3	0.5	0.5	0.2	0.2	0.0	0.0
Critical	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRASSLAND SUBAREA													
Wet	2.1	5.9	13.9	7.8	17.3	8.8	22.6	20.8	23.2	17.2	16.0	10.4	3.7
Abv. Norm	1.2	4.8	9.4	10.4	24.7	13.6	27.6	20.3	24.5	23.9	16.6	7.5	2.6
Blw. Norm	1.4	5.7	13.8	12.5	29.5	15.9	32.6	29.2	29.8	32.9	25.3	12.8	4.5
Dry	2.2	6.7	15.9	11.1	23.4	11.2	22.9	23.1	24.0	28.0	23.7	13.0	5.3
Critical	3.3	8.9	17.2	10.2	24.1	13.3	33.3	32.5	31.8	27.5	28.7	13.6	5.9
The following method is used to calculate real-time DMC supply water credits and applies to dischargers regulated under waiver of waste discharge requirements.													
Real-time CVP Supply Water Credit = $Q_{CVP} \cdot C_{CVP} \cdot 0.0008293 \cdot 0.5$													
Where:													
Q_{CVP} = volume of water delivered from CVP in acre-feet													
C_{CVP} = electrical conductivity of water delivered from CVP in $\mu\text{S}/\text{cm}$													
An additional supply water credit is provided to the Northwest Side Sub-area to account for salts contained in supply water diverted directly from the LSJR (LSJR diversion water credit). The LSJR diversion credit is equal to 50 percent of the salt load in supply water diverted from the San Joaquin River between the confluence of the Merced River and the Airport Way Bridge near Vernalis. The following fixed LSJR supply water credits apply to dischargers regulated under waste discharge requirements:													
LSJR supply water credits (thousand tons)													
Year-type	Month / Period												
	Jan	Feb	Mar	Apr 1 to Apr. 14	Pulse Period ¹	May 16 to May 31	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wet	0.0	0.6	9.2	6.2	9.4	11.0	17.2	23.5	20.5	9.5	1.3	0	0
Abv. Norm	0.0	0.8	5.0	7.4	12.3	11.2	21.8	24.9	20.3	10.7	1.5	0	0
Blw. Norm	0.0	0.6	5.5	7.0	14.4	13.4	27.3	33.1	24.9	13.9	2.4	0	0
Dry	0.0	0.7	5.3	6.4	11.1	10.7	27.5	34.0	20.3	11.4	2.4	0	0
Critical	0.0	0.8	4.5	5.1	14.8	10.6	25.2	28.5	22.3	8.7	2.5	0	0

Table IV-7 Base Load Allocations, Real-time Load Allocations, Supply Water Credits, and Supply Water Allocations (continued)

The following method is used to calculate Real-time DMC supply water credits and applies to dischargers regulated under waiver of waste discharge requirements.

$$\text{Real-time LSJR Supply Water Credit} = Q_{\text{LSJR DIV}} * C_{\text{LSJR DIV}} * 0.0008293 * .5$$

Where:

$Q_{\text{LSJR DIV}}$ = volume of water diverted from LSJR between the Merced River Confluence and Airport Way Bridge near Vernalis in acre-feet

$C_{\text{LSJR DIV}}$ = electrical conductivity of water diverted from the LSJR in $\mu\text{S/cm}$

SUPPLY WATER ALLOCATIONS

The U.S. Bureau of Reclamation DMC load allocation (LA_{DMC}) is equal to the volume of water delivered from the DMC (Q_{DMC}) to the Grassland and Northwest side Sub-areas at a background Sierra Nevada quality of 85 $\mu\text{S/cm}$.

$$LA_{\text{DMC}} = Q_{\text{DMC}} * 85 \mu\text{S/cm} * 0.0008293$$

¹Pulse period runs from 4/15-5/15. Period and distribution of base load allocation and supply water credits between April 1 and May 31 may change based on scheduling of pulse flow as specified in State Water Board Water Rights Decision 1641. Total base load allocation for April 1 through May 31 does not change but will be redistributed based on any changes in the timing of the pulse period.

SKIP AHEAD IN CHAPTER IV

ESTIMATED COSTS OF AGRICULTURAL WATER QUALITY CONTROL PROGRAMS AND POTENTIAL SOURCES OF FINANCING

San Joaquin River Subsurface Agricultural Drainage Control Program

The estimates of capital and operational costs to achieve the selenium objective for the San Joaquin River range from \$3.6 million/year to \$27.4 million/year (1990 dollars). The cost of meeting water quality objectives in Mud Slough (north), Salt Slough, and the wetland supply channels is approximately \$2.7 million /year (1990 dollars).

Potential funding sources include:

1. Private financing by individual sources.
2. Bonded indebtedness or loans from governmental institutions.
3. Surcharge on water deliveries to lands contributing to the drainage problem.
4. Ad Valorem tax on lands contributing to the drainage problem.
5. Taxes and fees levied by a district created for the purpose of drainage management.
6. State or federal grants or low-interest loan programs.
7. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs).

Pesticide Control Program

Based on an average of \$15 per acre per year for 500,000 acres of land planted to rice and an average of \$5 per acre per year for the remaining 3,500,000 acres of irrigated agriculture in the Sacramento and San Joaquin River Basins, the total annual cost to agriculture is estimated at

\$25,000,000. Financial assistance for complying with this program may be obtainable through the U.S.D.A. Agricultural Stabilization and Conservation Service and technical assistance is available from the University of California Cooperative Extension Service and the U.S.D.A. Soil Conservation Service.

San Joaquin River Salt and Boron Control Program

The estimates of capital and operational costs to implement drainage controls needed to achieve the salt and boron water quality objectives at the Airport Way Bridge near Vernalis range from 27 to 38 million dollars per year (2003 dollars).

Potential funding sources include:

1. Those identified in the San Joaquin River Subsurface Agricultural Drainage Program and the Pesticide Control Program.
2. Annual fees for waste discharge requirements.

3 Policies

3.1 Review of Existing Policies

Both the State Water Board and the Central Valley Regional Board have a number of existing policies that are potentially applicable to the control of agricultural discharges. These existing policies must be reviewed with respect to their applicability to the subject Basin Plan amendment. The Basin Plan amendment may need to include new policies specific to the control of salt and boron in the LSJR. Any new policies will address either the mitigation of a potential impact or will specify how the program of implementation will be carried out.

3.1.1 Central Valley Regional Board Policies

The following policies have been identified in the Central Valley Regional Board's Basin Plan as being potentially applicable to the control of salt and boron in the LSJR.

Controllable Factors Policy

The Regional Board's Controllable Factors Policy states that:

Controllable water quality factors are not allowed to cause further degradation of water quality in instances where other factors have already resulted in water quality objectives being exceeded. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board or Regional Water Board, and that may be reasonably controlled.

Evaluation: The Controllable Factors Policy states that controllable water quality factors cannot cause degradation of water quality when water quality objectives are already being exceeded. The proposed Basin Plan amendment is consistent with the Controllable Factors Policy because the salt and boron TMDL and associated program of implementation seek to bring an impaired water body back into compliance with water quality objectives. No additional controllable discharges are being proposed or are expected as a result of the proposed project. The program of implementation will, in fact, result in further restriction of existing discharges.

The Water Quality Limited Segment Policy

The Regional Boards Water Quality Limited Segment Policy states that:

Additional treatment beyond minimum federal requirements will be imposed on dischargers to Water Quality Limited Segments. Dischargers will be assigned or

allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.

Evaluation: The Water Quality Limited Segment Policy indicates that the Regional Board will assign or allocate a maximum allowable load to dischargers so that water quality objectives can be met. The proposed Basin Plan amendment will establish a control program that allocates available salt and boron loading to point and nonpoint source dischargers. The proposed Basin Plan amendment is, therefore, consistent with the Water Quality Limited Segment Policy.

Watershed Policy

The Regional Boards Watershed Policy states that:

The Regional Water Board supports implementing a watershed based approach to addressing water quality problems. The State and Regional Water Boards are in the process of developing a proposal for integrating a watershed approach into the Board's programs. The benefits to implementing a watershed based program would include gaining participation of stakeholders and focusing efforts on the most important problems and those sources contributing most significantly to those problems.

Evaluation: The proposed Basin Plan amendment is consistent with the Watershed Policy. The technical TMDL report for salt and boron in the LSJR includes a source analysis, which identifies the most significant sources of salt and boron loading to the river. These sources are controlled through waste load allocation and load allocations. The program of implementation for this TMDL has been developed to focus control efforts on the most important sources of pollution. The time schedule for implementation places priority on the most important salt and boron sources. The use of real-time water quality management as an implementation alternative promotes active stakeholder involvement and allows stakeholders to solve water quality problems with a relatively low level of regulation (i.e., waiver of waste discharge requirements).

Policy for Obtaining Salt Balance in the San Joaquin Valley

The Regional Boards Policy for Obtaining Salt Balance in the San Joaquin Valley states that:

It's the policy of the Regional Water Board to encourage construction of facilities to convey agricultural drain water from the San Joaquin and the Tulare Basins. A valley-wide conveyance facility for agricultural drain waters impaired by high levels of salt is the only feasible, long-range solution for achieving a salt balance in the Central Valley.

Evaluation: The proposed Basin Plan amendment is neutral with respect to the Policy for Obtaining Salt Balance in the San Joaquin Valley. The amendment is intended to result in

compliance with existing water quality standards. A salt balance is ultimately needed to meet water quality standards over the long-term. Placing limits on saline discharges, however, does not necessarily encourage or discourage the construction of an out-of-valley drain as a method to meet salt and boron load limits.

3.1.2 State Water Board Policies

Antidegradation Implementation Policy

State Water Board Resolution No 68-16, Statement of Policy with Respect to Maintaining High Quality of Water in California, in applicable part states that:

...Implementation of this policy [State Water Board Resolution No. 68-16] to prevent or minimize surface and ground water degradation is a high priority for the Board. ... The prevention of degradation is, therefore, an important strategy to meet the policy's objectives. (Notation added)

The Regional Water Board will apply 68-16 in considering whether to allow a certain degree of degradation to occur or remain. In conducting this type of analysis, the Regional Water Board will evaluate the nature of any proposed discharge, existing discharge, or material change therein, that could affect the quality of waters within the region. Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

Pursuant to this policy, a Report of Waste Discharge, or any other similar technical report required by the Board pursuant to Water Code Section 13267, must include information regarding the nature and extent of the discharge and the potential for the discharge to affect surface or ground water quality in the region.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives. The extent of information necessary will depend on the specific conditions of the discharge. For example, use of best professional judgment and limited available information may be sufficient to determine that ground or surface water will not be degraded. In addition, the discharger must identify treatment or control measures to be taken to minimize or prevent water quality degradation.

Evaluation: The proposed Basin Plan amendment does not specifically authorize any new or existing discharges and therefore it is not expected to result in any further degradation of a water body. The proposed Basin Plan amendment is intended to improve an impaired water body by implementing existing water quality objectives through load reductions.

The State Policy for Water Quality Control

This policy was established by the State Water Board in 1972 and includes general principles for the implementation of “water resources management programs.” Key principles that are applicable to this Basin Plan amendment include:¹

1. *Water rights and water quality control decisions must assure protection of available fresh water and marine water resources for maximum beneficial use.*
2. *Municipal, agricultural, and industrial wastewaters must be considered as a potential integral part of the total available fresh water resource.*
3. *Coordinated management of water supplies and wastewaters on a regional basis must be promoted to achieve efficient utilization of water...*
11. *Water quality criteria must be based on the latest scientific findings. Criteria must be continually refined as additional knowledge becomes available.*
12. *Monitoring programs must be provided to determine the effects of discharges on all beneficial waters uses including effects on aquatic life and its diversity and seasonal fluctuations...*

Water quality control plans and waste discharge requirements hereafter adopted by the State and Regional Boards under Division 7 of the California Water Code shall conform to this policy...

Departures from this policy and water quality control plans adopted by the State Board may be desirable for certain individual cases. Exceptions to the specific provisions may be permitted within the broad framework of well established goals and water quality objectives.

Evaluation: The proposed Basin Plan amendment includes a program of implementation designed to achieve existing water quality objectives that have been established for salinity and boron in the Lower San Joaquin River at the Airport Way Bridge Near Vernalis. These water quality objectives have been established to protect the most sensitive beneficial uses of the LSJR, which include agricultural and municipal supply. The program of implementation for this Basin Plan amendment will be developed to promote the re-use of agricultural drainage and municipal wastewater to reduce salt loading to the LSJR. Increased water use efficiency will be an added benefit of water re-use. This Basin Plan amendment does not propose any new or modified water quality criteria. A separate Basin Plan amendment, however, is concurrently being developed to evaluate the existing salinity and boron water quality objectives and beneficial uses for

¹ The numbering is from section II of the policy.

the LSJR. Any new or modified water quality criteria developed as part of that Basin Plan amendment will be based on the latest scientific findings. The proposed Basin Plan amendment is therefore consistent with the State Policy for Water Quality Control.

Statement of Policy with Respect to Maintaining High Quality of Water in California

The policy (State Water Board Resolution No. 68-16) includes the following statements:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increase volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.”

Evaluation: The Lower SJR is listed on California’s 303(d) list as an impaired water body, and the existing water quality in the river is not better than the quality prescribed in the Basin Plan. The proposed Basin Plan amendment is expected to improve salt and boron water quality conditions in the LSJR. No increases in volume or concentration of wastes are being proposed.

Nonpoint Source Management Plan

In 1988, the State Water Board adopted the first Nonpoint Source Management Plan (Resolution 88-123). An update to that plan, required under the Coastal Zone Act Reauthorization Amendments of 1990, was approved by the USEPA and National Oceanic and Atmospheric Administration in July 2000. That plan outlines a three-tiered approach to address nonpoint source (NPS) water quality problems.

Tier one, as described in the 2000 update, is “self-determined implementation of management practices.” Tier one allows “...landowners and resource managers to develop and implement workable solutions to NPS pollution control and to afford them the opportunity to solve their own problems before more stringent regulatory actions are taken” (SWRCB/CCC, 2000). Tier two is defined as “regulatory-based encouragement of management practices.” The two general approaches described for encouraging adoption of management practices is by waiving adoption of WDRs or by entering into Management Agency Agreements with agencies that have authority to enforce best

management practices. Tier three includes the establishment of effluent limitations through WDRs or the application of other Regional Board authorities to bring about compliance with water quality objectives.

Evaluation: The majority of the anthropogenic salt and boron loads to river originate from nonpoint sources of pollution. The proposed Basin Plan amendment must be developed to be consistent with the Nonpoint Source Management Plan. The program of implementation alternatives for this Basin Plan amendment will be evaluated with respect to consistency with the three-tiered approach set forth in the Nonpoint Source Management Plan.

3.1.3 Need for New or Modified Policies

The need for new or revised policies will be evaluated in the remainder of this staff report.

4 Basin Plan Chapters

The purpose of a Basin Plan amendment is to update the Water Quality Control Plan (Basin Plan) with new water quality control actions such as new water quality objectives or, as in this case, an implementation plan for a TMDL. The Basin Plan amendment staff report presents the needed Basin Plan language (revisions, deletions, and/or additions) and information to support these changes. The Basin Plan consists of five chapters:

- 1) Introduction
- 2) Existing and Potential Beneficial Uses
- 3) Water Quality Objectives
- 4) Implementation
- 5) Surveillance and Monitoring

An amendment to the Basin Plan must consider each of these chapters. The following five sections provide background information and discussion for each of these five chapters.

4.1 Introduction

The introductory chapter of the Basin Plan contains a description of the planning area and the major hydrologic features of the basin. The Basin Plan area is subdivided into two major watershed delineations: the Sacramento River Basin and the San Joaquin River Basin.

The Basin Plan now includes an inaccurate description of the planning boundary between the San Joaquin Basin and the Tulare Lake Basin. Current Basin Plan language indicates that divide between these two basin is formed by the northern boundary of the Little Panoche Creek Basin. The Little Panoche Creek Basin is, however, contained entirely in the San Joaquin River Basin. Changes are proposed to correct this error. The boundary between the San Joaquin River Basin and the Tulare Lake basins actually follows the natural drainage divide from the crest of the Coast Range along the southern portions of

the Little Panoche Creek, Moreno Gulch, and Capita Canyon drainages to boundary of the Westlands Water District. From here, the boundary runs along the northern edge of the Westlands Water District until the intersection with the Firebaugh Canal Company's Main Lift Canal. The basin boundary then follows the Main Lift Canal to the Mendota Pool and continues eastward along the channel of the San Joaquin River to Millerton Lake in the Sierra Nevada foothills, and then follows along the southern boundary of the San Joaquin River drainage basin.

In 1996 a description of the Grassland Watershed was added to the Basin Plan to implement the existing control program for agricultural subsurface drainage discharges. Similarly, additional sub-watershed delineations (subareas) need to be added to the Basin Plan to facilitate implementation of the proposed control program. The LSJR watershed will be divided into seven major geographic subareas. The Grassland Subarea will replace the existing description of the Grassland Watershed. In some cases, major subareas have been further subdivided into minor subareas (Table 2-1). The addition of these subareas will allow implementation efforts to be prioritized on the most important sources of pollution by applying different compliance time schedules to different subareas. Other water quality control programs will also use the new subareas.

4.2 Beneficial Uses

The Basin Plan designates beneficial uses for specific water bodies in the Sacramento and San Joaquin River drainage basins. Beneficial use designations determine the level of protection that a water body receives since water quality objectives must be set to protect the most sensitive beneficial uses. Procedures used in identifying beneficial uses are specified in the Clean Water Act and the California Water Code. The beneficial uses that may be protected include, but are not limited to, *domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves* (CWC §13050(f)). Waste discharge into waters of the State is a privilege and not a right (CWC §13263). As such, waste discharge, assimilation, and transport are not recognized as beneficial uses.

The salt and boron TMDL is intended to implement existing water quality objectives that protect existing designated beneficial uses. The existing salinity water quality objectives applicable to the San Joaquin River at the Airport Way Bridge near Vernalis were adopted by the State Water Board in the 1995 Bay Delta Plan. The State Water Board also adopted beneficial uses for the Bay Delta Estuary which apply downstream of Vernalis. The Regional Board has not yet established water quality objectives for salinity in the San Joaquin River (upstream or downstream of Vernalis). The Basin Plan, however, includes designated beneficial uses for three specific reaches of the San Joaquin River (Table 4-1). The salinity water quality objectives contained in the State Water Board's Bay Delta Plan and the beneficial uses contained the Regional Board's Basin Plan have been approved by the USEPA.

This Basin Plan amendment does not propose any changes to the designated beneficial uses contained in current version of the Basin Plan. A separate Basin Plan amendment to

adopt new salt and boron objectives upstream of Vernalis may, however, propose to eliminate, modify and/or add beneficial uses to the San Joaquin River. Any proposed modification to beneficial uses will be addressed in the staff report for that amendment and would be afforded full public review and require formal Regional Board action.

Table 4-1: Existing Site-specific Beneficial Uses of the San Joaquin River

LOWER SAN JOAQUIN RIVER REACH	MUN	AGR		PROC	REC-1		REC-2	WARM	COLD	MIGR		SPWN		WILD
	MUNICIPAL AND DOMESTIC SUPPLY	IRRIGATION	STOCK WATERING	INDUSTRIAL PROCESS	CONTACT	CANOEING AND RAFTING	OTHER NONCONTACT	FRESHWATER HABITAT-WARM	FRESHWATER HABITAT-COLD	WARM	COLD	WARM	COLD	WILDLIFE HABITAT
MENDOTA DAM TO SACK DAM	P	E	E	E	E	E	E	E		E	E	E	P	E
SACK DAM TO MERCED RIVER	P	E	E	E	E	E	E	E		E	E	E	P	E
MERCED RIVER TO VERNALIS	P	E	E	E	E	E	E	E		E	E	E		E
E=EXISTING P=POTENTIAL														
Source: Water Quality Control Plan for the Sacramento and San Joaquin River Basins, Fourth Edition														

4.2.1 Alternatives Considered

No alternatives have been considered because no changes to the designated beneficial uses of the San Joaquin River are proposed.

Modification of Uses (limited use)

Modifications to the designated beneficial uses of the San Joaquin River are not needed as part of the proposed Basin Plan amendment. Beneficial uses modifications may be sought in the future when new water quality objectives are proposed for the San Joaquin River upstream of Vernalis.

Addition of Uses

No beneficial uses will be added as a result of the proposed amendment.

4.2.2 Evaluation of Alternatives

No evaluation of alternatives is required since no changes in the existing beneficial uses are proposed.

4.2.3 Recommended Alternative for Beneficial Uses

The no project alternative is the recommended alternative because changes to the beneficial uses of the San Joaquin River are not proposed or needed to implement this first phase of the salt and boron TMDL.

4.3 Water Quality Objectives

Water quality objectives are defined in the California Water Code (§13050(h)) as “... *the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.*” In setting objectives, Water Code Section 13244 requires the Regional Board to consider the following factors:

- Past, present, and probable future beneficial uses
- Environmental characteristics of the hydrographic unit under consideration including the quality of water available thereto
- Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area
- Economic considerations
- The need for developing housing within the region
- The need to recycle and use recycled water

State and federal antidegradation policies, federal requirements and other factors must also be considered when setting the objectives.

The State Water Board’s Bay Delta Plan contains salinity water quality objectives for the surface waters relevant to this effort. Additionally, the Regional Board’s Basin Plan contains numeric boron water quality objectives for the San Joaquin River (Table 4-2). The proposed Basin Plan amendment is intended to result in attainment of the existing water quality objectives that apply to the LSJR at the Airport Way bridge near Vernalis.

Table 4-2: Salinity and Boron objectives for the lower San Joaquin River at Vernalis

SALINITY		
Reach	Irrigation Season (Apr1-Aug31)	Non-Irrigation Season (Sep1 –Mar 31)
Vernalis Only	700 µS/cm (30-day running avg.)	1000 µS/cm (30-day running avg.)
BORON		
Reach	Irrigation Season (Mar 15-Sep15)	Non-Irrigation Season (Sep16-Mar14)
Sack Dam to Merced River	2.0 mg/L (max.)	5.8 mg/L (max.)
	0.8 mg/L (monthly mean)	2.0 mg/L (monthly mean)
Merced River to Vernalis	2.0 mg/L (max.)	2.6 mg/L (max.)
	0.8 mg/L (monthly mean)	1.0 mg/L (monthly mean)
		1.3 mg/L (monthly mean)*

* Critical year relaxation value

4.3.1 Alternatives Considered

No alternatives have been considered because no changes to the San Joaquin River water quality objectives are proposed.

4.3.2 Evaluation of Alternatives

Not Applicable- no new water quality objectives are proposed.

Past, Present, and Probable Future Beneficial Uses of Water

Federal law requires that states adopt criteria that protect beneficial uses and that the most sensitive use be protected (40 CFR § 131.11(a)). State law requires the reasonable protection of beneficial uses and that beneficial uses of water be considered in establishing water quality objectives (Wat. Code, § 13241, et seq.). Agricultural supply and municipal supply are generally considered the most sensitive beneficial uses of the San Joaquin River with respect to salt and boron. The existing water quality objectives for salt and boron have been adopted by the State Water Board and the Regional Board, respectively, and have been determined to be protective of the beneficial use of the San Joaquin River.

Water Quality Conditions that could be Reasonably Achieved

The technical TMDL report for salt and boron includes a linkage analysis that indicates that significant water quality improvements can be achieved through TMDL implementation. Staff analysis indicates, however, that some exceedences of the Vernalis salinity WQO will occur even with a comprehensive program of implementation in place. The exceedance rates associated with each alternative implementation program are evaluated in Section 4.3.2 of this report. Water quality exceedences are expected to continue as a result of uncontrollable saline discharges (primarily ground water accretions) during times when no controllable discharges are allowed pursuant to the proposed program of implementation. Full compliance with salinity water quality objectives can only be achieved through a combination of restricting saline discharges and providing increased flows to dilute salt loads. The Regional Board can limit saline discharge through its authority under the California Water Code. Change in flow, however, is a water rights issue that must be addressed by the State Water Board, as the Regional Board does not have authority over water rights.

Recognizing that hydromodification has caused salinity impacts to the San Joaquin River, the State Water Board's Decision 1641 amended the Central Valley Project (CVP) permits under which the United States Bureau of Reclamation (USBR) delivers water to the San Joaquin Basin. The CVP permits now require that the USBR meet the 1995 Bay Delta Plan salinity objectives at Vernalis, which are equivalent to the numeric targets established in salt and boron TMDL. This is critically important because load reductions alone will not result in achievement of water quality standards. Future out of basin water transfers, if not appropriately administered, could exacerbate the salt and boron problems by further reducing the assimilative capacity of the river. Coordination between the

Regional Board and State Water Board is key to ensuring that the WQO's for salt and boron are met.

Economic Considerations

A discussion of economic considerations pertaining to the proposed Basin Plan amendment is provided in Appendix 4.

The Need for Developing Housing

The proposed Basin Plan amendment should not impact the need for housing or the availability of housing in the San Joaquin River Watershed.

The Need to Develop and Use Recycled Water

The program of implementation to control salt and boron discharges into the LSJR will be evaluated with respect to the need to develop and use recycled water. The control program for salt and boron discharges into the LSJR will further limit the amount of agricultural drainage, wetland drainage, and municipal effluent that can be discharged to the LSJR. It is therefore anticipated that agricultural drainage and municipal wastewater re-use practices will be implemented to reduce salt and boron loads to the LSJR. The proposed Basin Plan amendment will therefore promote the development and use of recycled water.

Endangered Species Act

Not Applicable- no new water quality objectives are proposed.

Summary of Evaluation of Alternatives

Not Applicable- no new water quality objectives are proposed.

Recommended Alternative for Water Quality Objectives

The no project alternative is the recommended alternative because changes to the water quality objectives of the San Joaquin River are not proposed or needed to implement this first phase of the salt and boron TMDL.

4.4 Program of Implementation

Current USEPA regulations do not require TMDLs to include implementation plans. *“Federal Law states that TMDL, upon EPA approval, be incorporated into the state's water quality management plan. California's water quality management plan consists of the Regional Board's basin plans and statewide water quality control plans. State Law, in turn, requires that basin plans have a program of implementation to achieve water quality objectives”* (Written com., Attwater, 1999). California Water Code Section 13242 states that the program of implementation for achieving water quality objectives shall include, but not be limited to:

- 1) A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private

- 2) A time schedule for the actions to be taken
- 3) A description of surveillance to be undertaken to determine compliance with objectives

The purpose of the implementation program is to specify the steps the Board will take to implement the salt and boron TMDL thereby obtaining compliance with existing water quality objectives. Salt and boron levels in the LSJR already exceed concentrations that impact the identified beneficial uses and therefore the Board's control program must involve reductions in the amount of these constituents discharged. This program will apply to all surface water discharges (other than stormwater runoff) from the LSJR watershed.

This section includes: 1) a description of the loading capacity and water quality goals for salt and boron in the LSJR; 2) a discussion of the physical implementation practices that are available for controlling salt and boron; 3) a description the agencies or entities with the responsibility or ability to implement salt and boron controls; 4) a description of the criteria that will be used to evaluate the salt and boron implementation options; and 5) a description of the regulatory and non-regulatory mechanisms available to the Regional Board to implement the salt and boron TMDL. The best available implementation options are identified through an evaluation process and these selected options are used to develop a series of alternatives. Finally, the alternatives are evaluated in Section 4.4.7 and preferred program of implementation alternative is recommended. Some terminology used in the chapter is described below to assist the reader.

Implementation practices: Operational and physical practices used by dischargers (e.g., growers, municipalities, and wetland operators) to control salt and boron discharges to the San Joaquin River.

Implementation options: Regulatory and non-regulatory controls used by the Regional Board or its designee(s) to control salt and boron discharges to the LSJR.

Alternatives: A combination of the best available implementation options to be used as a comprehensive program of implementation for controlling salt and boron to the San Joaquin River.

4.4.1 Loading Capacity and Interim Water Quality Goals

Section 303(d)(1)(C) of the Clean Water Act requires the establishment of the Total Maximum Daily Load (TMDL) for waters identified on the 303(d) list, if the USEPA Administrator has determined that the pollutant is suitable for a TMDL calculation. The TMDL must be "...established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."

Federal regulations provide further definition of the structure and content of TMDLs. TMDLs shall “... take into account critical conditions for stream flow, loading, and water quality parameters” (40 CFR § 130.7(c)(1)).

TMDLs are defined as the sum of the individual waste load allocations (WLAs) and load allocations (LAs). TMDLs can be expressed in terms of “... mass per time, toxicity, or other appropriate measure.” WLAs are the portion of the receiving water’s loading capacity allocated to existing or future point sources and LAs are the portion of the receiving water’s loading capacity allocated to existing or future nonpoint sources of pollution or to natural background sources. The loading capacity is the greatest amount of loading a water can receive without violating water quality standards (40 CFR § 130.2 (f), (g), (h), (i)).

The details of the TMDL calculations and methodology can be found in Appendix 1. The remainder of this section provides a summary of the TMDL for salt and boron in the LSJR.

Phased Approach

The salt and boron TMDL uses a phased approach because new or revised water quality objectives for salinity and boron may be established as part of another Basin Plan amendment that is concurrently being developed. The waste load allocations and load allocations presented in this TMDL are designed to meet salinity and boron water quality objectives in the LSJR at the Airport Way Bridge near Vernalis. These waste load allocations and load allocations may therefore need to be revised to reflect any new or revised water quality objectives. Accordingly, the methods used in the salt and boron TMDL to develop allocations will be applied to calculate load allocations based upon new or revised water quality objectives.

Waste Load Allocations

Salt waste load allocations are proposed for the City of Turlock and the City of Modesto wastewater treatment plants, the two major point sources that discharge directly to the LSJR. The waste load allocations are concentration limits set equal to the electrical conductivity WQOs for the LSJR at the Airport Way Bridge near Vernalis. The waste load allocations should not be applied in a manner that will increase the effluent limits for salinity (i.e., EC, TDS) that have already been established in existing NPDES permits that apply in the LSJR watershed. The waste load allocations should be used as an upper limit in setting effluent limits for future NPDES permits, recognizing that site-specific conditions may warrant lower salinity limits.

Load Allocations

The SJR salinity problem is not conducive to establishment solely of inflexible fixed or seasonal monthly load allocations for nonpoint sources. Consideration of the following factors necessitated use of a more complicated, formulaic TMDL:

- Salt and boron occur naturally in soils within the TMDL project area and these salts are readily evapoconcentrated through sequential re-use and consumptive use of water.
- Significant salt loads are delivered to the basin from outside sources which restrict the ability of nonpoint source dischargers to comply with discharge load limits.
- Strict adherence to fixed load allocations would restrict the ability to export salt from the LSJR basin such that there would be a net salt buildup in the watershed and long-term degradation of ground and surface waters.

Base Load Allocation

Simple, fixed base load allocations for nonpoint source discharges from seven geographic subareas have been established by calculating the available assimilative capacity of the LSJR at the Airport Way Bridge near Vernalis for the lowest anticipated flow conditions. The base load allocation calculation method uses an operations model to identify low flow conditions for a 73-year historical flow record, sorted by water-year type and month. Waste load allocations, background salt loading, and groundwater salt loading are subtracted from the total loading capacity to determine the salt load that can be allocated to nonpoint sources. The nonpoint source load allocation is apportioned into base load allocations for the seven geographic subareas. The base load allocation considers the seasonal variability of flows in the LSJR and includes an implicit margin of safety since the allocations are based upon the lowest flow conditions anticipated in the LSJR for each month and water year type.

Consumptive Use Allocation

Each subarea is also provided a consumptive use allocation that allows for unlimited discharge of relatively high quality water. Through addition of this consumptive use allocation to all dischargers, this TMDL recognizes the need to provide a base salt load allocation to account for evapoconcentration of salts in a high quality supply water and opportunity for discharging relatively high quality water.

Supply Water Credits and USBR Load Allocations

Additional load allocations have been provided to the Grasslands and Northwest Side Subareas to account for the local impact of degraded Central Valley Project (CVP) and surface water supplies delivered to these subareas. This additional salt load allocation is offset by establishing load allocations (limits) for the CVP. In effect, responsibility is placed on the U.S. Bureau of Reclamation (USBR) for salt loads in CVP water delivered to the TMDL project area that is in excess of a base load for an equivalent volume of Sierra Nevada quality water.

Real Time Load Allocations

The base load allocations are very conservative because they have been designed to meet water quality objectives during critically low flow conditions. This TMDL recognizes that strict adherence to these base load allocations would restrict the ability to export salt from the LSJR basin, likely resulting in a net salt buildup in the watershed and long-term

degradation of ground and surface waters. To overcome this restriction, the TMDL provides for an additional real-time load allocation. The real-time load allocation can be used in-lieu of the fixed base load allocation to maximize salt export from the LSJR basin while still meeting water quality objectives. To ensure that the water quality objectives are met, development of an acceptable real-time management program is a prerequisite to use of real-time load allocations.

Boron allocations

No explicit boron waste load allocations or load allocations are needed to meet boron objectives for the LSJR near Vernalis. The TMDL for salt and boron in the LSJR shows that compliance with the established salt load allocations will result in corollary attainment of boron objectives. The TMDL linkage analysis indicates that the boron water quality objectives for the LSJR at the Airport Way Bridge near Vernalis would be exceeded approximately one percent of the time with the TMDL in effect.

4.4.2 Available Practices and Technology

There is no single set of implementation practices or technology that will ensure that the water quality objectives for salt and boron will be met. Salt and boron water quality improvement in the LSJR can be achieved through one or more of the following methods:

- 1) Reducing salt and boron loads imported to the LSJR watershed in supply water
- 2) Increasing the assimilative capacity of the LSJR by providing dilution flow
- 3) Reducing salt and boron loading from point and/or nonpoint sources
- 4) Increasing the amount of salt exported from the LSJR watershed, including through re-operation of drainage and real-time water quality management or through the use of an out-of-valley drain

Technical groups for the San Joaquin Valley Drainage Program, CALFED and other efforts investigating the salinity problem have identified a number of practices that may be effective in reducing salt levels in the river. These practices are summarized in Appendix 2. Salinity management practices must be site-specific because the salt generating capacity and drainage needs vary throughout the LSJR watershed due to differences in soils, supply water quality, and drainage and irrigation technology.

4.4.3 Agencies or Entities with Responsibility for Implementing Salinity Controls

Although the Board could implement the TMDL entirely through its regulatory authority, implementation of load allocations alone will not ensure that water quality objectives will be achieved, as uncontrollable discharges (e.g., groundwater accretions) may still cause water quality exceedances during certain flow regimes. The Board must therefore evaluate and eventually implement a combination of actions and approaches that involve working with the State Water Board, the USBR, and public water agencies (local water districts) to ensure that the salt and boron water quality objectives are achieved. This section describes the agencies that have the ability to affect salt and boron concentrations

in the LSJR either through their authority to regulate discharges, authority over water rights, as water suppliers, or as resource management agencies.

State Water Resources Control Board and Regional Board Water Quality Control Board

The USEPA has designated the State Water Board as the state water pollution control agency with the authority to implement the Clean Water Act in California. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) is the principal law governing water quality regulation in California. The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and the nine Regional Water Quality Control Board as state agencies having primary responsibility for regulating water quality in California.

The Central Valley Regional Water Quality Control Board (Board) will be the primary agency responsible for implementing the salt and boron control program. The Board will establish waste load allocations for point source discharges and load allocations for nonpoint sources discharges through the TMDL process. Portions of the TMDL, as well as a program of implementation, will be codified in the Basin Plan. The Board will use its regulatory authority, as specified in this program of implementation, to ensure that point and nonpoint dischargers comply with applicable waste load allocations and load allocations.

An important difference between the State Water Board and the Regional Boards is that the State Water Board has authority over water rights; the Regional Boards do not. Water quality and water rights are inextricably linked in the San Joaquin River system. Hydro-modification has had a profound effect on water quality. As more water is consumptively used, less water is available to assimilate pollutants. Agricultural water conservation could reduce pollutant loading from return flows back to the river potentially making water available for other beneficial uses. Conversely, such increased efficiency may reduce the assimilative capacity of the San Joaquin River by reducing the quantity of higher quality return flows or through transfers of “saved” water to out of basin users. The Regional Board must therefore work closely with the State Water Board Division of Water Rights to ensure that water conservation and associated water transfers are conducted in a manner that considers and protects water quality in the San Joaquin River. The State Water Board can condition water rights permits to include provisions to protect fish and wildlife or other resources such as water quality. In this capacity, the State Water Board should continue to use its water rights authority to implement the existing salinity water quality objectives contained the 1995 Bay Delta Plan or any new water quality objectives proposed by the Regional Board.

United States Bureau of Reclamation

The 1902 National Reclamation Act established the USBR. This act authorizes the Secretary of the Interior to develop irrigation and hydropower projects in California and 16 other Western States. The Central Valley Project (CVP) is a major federally funded water development project operated by the USBR in California. Major CVP facilities in the San Joaquin River watershed include Friant Dam and Millerton Reservoir, the

Madera and Friant-Kern canals (which deliver Millerton Reservoir water to the north and out of basin to the South), the Tracy pumping plant, and the DMC (which conveys Delta water from the Tracy pumping plant to the western San Joaquin Valley).

Operation of the CVP has had a dramatic affect on LSJR flow and water quality by diverting most of the natural San Joaquin River flow out of the San Joaquin River watershed in combination with importing large volumes of water from the Delta to the LSJR watershed. Reduced water flows have seasonally reduced the assimilative capacity of the LSJR and imported “replacement” water has a salt content that is significantly higher than that of the natural river. CVP water imports to the LSJR account for almost half of the mean annual salt load discharged from the LSJR at the Airport Way Bridge near Vernalis (Appendix 1).

The State Water Board’s Water Rights Decision 1641 found that the “*actions of the CVP are the principal causes of salinity concentrations exceeding water quality objectives at Vernalis.*” Consequently, the State Water Board amended the permits under which the USBR delivers water to the San Joaquin River Basin to require that the USBR meet the 1995 Bay Delta Plan salinity objectives at Vernalis.

The salt and boron TMDL also recognizes the USBR’s role in impairing the LSJR water quality by placing load allocations on the USBR for CVP deliveries. In effect, the USBR will be responsible for meeting these load allocations by providing mitigation in the LSJR watershed. Mitigation could include, but is not limited to, providing additional flows to assimilate loads in excess of CVP load allocations and working with other dischargers to reduce salt loading from agricultural returns. Additionally, the USBR could alleviate its excess load burden through implementation of real-time management of saline discharges. Under this approach the USBR could obtain load credits for salt loads that are retained during periods of no assimilative capacity, followed by future release of retained salts when assimilative capacity is available.

In 2000, the Ninth Circuit Court of Appeals directed the USBR to promptly provide drainage to the San Luis Unit (which includes portions of the LSJR Watershed). The USBR is currently evaluating options to fulfill this mandate through its San Luis Unit Feature Re-evaluation Project. If the project were executed, the USBR would provide drainage to the majority of tile-drained lands in the Grassland Subarea. The USBR is evaluating three primary options to provide drainage to the San Luis Unit including : 1) In-Valley Disposal; 2) Ocean Disposal; and 3) Delta Disposal. All three options would result in removal or isolation of the majority of the Grassland subarea tile drainage from the LSJR Watershed. We estimate that Grassland Subarea tile drainage comprises approximately 15 percent of the LSJR’s total salt load as measured at the Airport way Bridge near Vernalis (Appendix 1). The San Luis Drainage Feature Re-evaluation Project, if implemented, is expected to have significant positive effect on water quality in the LSJR. Salts removed or isolated from the San Joaquin River by the San Luis Drainage Feature Re-evaluation Project would be applied as a credit toward meeting the USBR’s CVP load allocation.

As the largest discharger of salt to the LSJR watershed, the USBR must play a commensurate role in the control of salt discharges. The Regional Board could formally engage the USBR in a salinity control program either through a cooperative mechanism such as a Management Agency Agreement (MAA) or through a regulatory mechanism such as a WDRs. These options are discussed in more detail in Section 4.2.1.

Local Waters Districts

California Water Code Section 20200 defines a water district as any district or other political subdivision other than a city or county, a primary function of which is the irrigation, reclamation, or drainage of land or the diversion, storage, management, or distribution of water primarily for domestic, municipal, agricultural, industrial, recreation, fish and wildlife enhancement, flood control, or power production purposes. Water districts include, but are not limited to, irrigation districts, county water districts, water storage districts, reclamation districts, county waterworks districts, drainage districts, water replenishment districts, levee districts, municipal water districts, water conservation districts, community services districts, water management districts, flood control districts, flood control and floodwater conservation districts, flood control and water conservation districts, water management agencies, and water agencies.

There are approximately 30 public water agencies that have jurisdiction in the LSJR TMDL project area. The area contains approximately 9,000 individual farms (Table 4-3) that comprise over 1.4 million acres of agricultural land. This makes water quality control difficult at the individual farm scale. Public water agencies are generally better equipped to monitor and manage drainage than individual farmers. For these reasons, the Regional Board may seek compliance with TMDLs at the subarea level by using regulatory and non-regulatory mechanisms to engage public water agencies. We anticipate that most landowners will prefer to achieve TMDL compliance under the auspices of their respective public water agencies rather than work directly with the Regional Board. By working at the district level, individual landowners can reduce TMDL compliance expenses through cost sharing of water quality planning and monitoring activities. Public water agencies will be encouraged to work together to implement regional salinity controls at the sub-basin scale, thus providing further increased economy of scale and more flexibility to both individual landowners and water districts in meeting TMDL load allocations. The Board will need to work with individual landowners in areas that are not within the jurisdiction of a public water agency and in areas where public agencies decline to serve as representatives of their members on this issue.

Table 4-3. Estimated Number of farms within the Lower San Joaquin River TMDL Project Area

County	Ag Acres in County ¹	Ag Acres in Project Area ²	Percent of Ag in Project Area ³	Farms/county ⁴	Farms in Project Area ⁵
San Joaquin	578,310	14,486	2.5%	3,862	97
Stanislaus	404,250	380,666	94.2%	4,009	3,775
Madera	366,144	342,454	93.5%	1,673	1,565
Fresno	1,343,255	153,537	11.4%	6,592	753
Merced	541,741	541,741	100.0%	2,831	2,831
Estimated No. of Farms in Project Area					9,021
¹ Source: GIS analysis of DWR county level land use surveys ² Source: GIS analysis of the agriculture acreage within each county that is also within the TMDL project area ³ = [(Ag acres in project area/Ag acres in county) X 100] ⁴ Source: California Agricultural Statistics Service ⁵ = farms per county X percentage of agricultural land in the TMDL project area					

The concept of managing agricultural drainage at the water district and sub-basin level is evaluated and supported in a 1990 report entitled *Legal and Institutional Structures for Managing Agricultural Drainage in the San Joaquin Valley: Designing a Future* that was prepared by the Natural Heritage Institute (NHI) for the San Joaquin Valley Drainage Program. This report states that water supply districts have the ability to provide drainage service and seem to be best suited to take on drainage management responsibilities for a number of reasons including but not limited to:

- *The districts are in the best position to implement source control, given they are the dominant suppliers of irrigation water*
- *The districts can promote uniform improvements in irrigation practices on the farm*
- *The local districts are better able than the water development or regulatory agencies to tailor drainage solutions to the local variables*
- The active cooperation of the districts and growers will be indispensable to a stable solution. That cooperation is most likely to occur if the districts, rather the federal or state agencies, are given control over drainage management (NHI, 1990, pp. I-3 to I-4.).

Joint Powers Authority

Government entities in California can establish formal methods of cooperation through a mechanism called a Joint Exercise of Powers Authority (JPA). A JPA can be used by public agencies, including districts, to perform almost any function within the joint authorities of the agencies. Such agreements can be a contractual delegation of authority (empowering an agency to act on behalf of the other parties) or provide for the creation of a new entity to carry out the goals of the agencies party to the JPA. An advantage of JPAs is that they can provide a structure for conducting a range of activities through an independent entity, while leaving internal structure and procedural operations of participating districts intact, eliminating the need for reorganization of districts which

might otherwise be needed to address specific functions or activities (NHI, 1990, Appendix 3, p. 2.).

An example is the San Luis & Delta-Mendota Water Authority (SLDMWA), established in January of 1992. It consists of 32 water agencies representing approximately 2,100,000 acres of federal and exchange water service contractors within the western San Joaquin Valley, San Benito and Santa Clara counties. A primary purpose of establishing the SLDMWA was to assume the operation and maintenance responsibilities of certain USBR Central Valley Project facilities, with the goal of managing the facilities more efficiently and at a lower cost than the USBR. The SLDMWA also develops and disseminates information to legislative, administrative, and judicial bodies on a variety of issues such as: Sacramento and San Joaquin Delta water exports, water supply, water quality, water development, conservation, distribution, drainage, contractual rights, and surface and groundwater management. The SLDMWA also played an instrumental role in the December 15, 1995, Bay Delta Accord and developing legislation passed in 1996 by California voters as Proposition 204 - The Safe, Clean, Reliable Water Supply Act. (SLDMWA, 2002.)

The SLDMWA is a participant in the Grassland Bypass Project. This project involves the coordination and cooperation of multiple state and federal entities with overlapping authorities, interests or activities, including USBR, U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS), USEPA, CVRWQCB, California Department of Fish and Game (CDFG), and the SLDMWA. The SLDMWA is responsible for controlling agricultural drainage water flows to and from the bypass. The CVRWQCB sets and enforces water quality regulations. The USBR, as owner of the bypass, is responsible for decisions regarding the use of the facility and compliance with Use Agreement No. 6-07-20-w1319, signed on November 3, 1995, between USBR and the SLDMWA. An oversight committee comprised of representatives from USBR, USFWS, CDFG, CVRWQCB, and the USEPA assists with decisions regarding the project and evaluates all operations of the project including monitoring and compliance with selenium load reduction goals. Sediment and water quality monitoring, biota sampling and toxicity testing are carried out or overseen by project participants. (SFEI, 2002 and Karkoski *et al*, 2002)

4.4.4 Criteria Used for Evaluating Implementation Options

There are number of regulatory and non-regulatory implementation options that the Regional Board can use to achieve compliance with salt and boron water quality objectives. These options are presented in Section 4.4.5 below and range from conventional regulatory methods such as issuance of WDRs to non-regulatory approaches such as providing grant funding for implementation of nonpoint source controls. Each option has pros and cons and that must be evaluated in order to identify the best available options. This section presents and explains the criteria that will be used to evaluate the implementation options.

Feasibility

Evaluation of feasibility is based on: 1) the technical feasibility of meeting water quality objectives and load allocations through implementation of an option; 2) the degree to which a given implementation option has a clearly defined process; and 3) the degree to which any constraints or requirements associated with the implementation option is likely to be met. Implementation options that have a proven track record of success and have worked well in a similar application (i.e., National Pollutant Discharge Elimination System (NPDES) permits to control wastewater treatment plant discharges, conditional prohibition of discharge to control rice pesticides, etc.) are also likely to be effective in controlling salt and boron discharges to the LSJR while allowing for continuation of the regulated activity. Alternatively, certain control options may not be feasible because the constraints of implementing the control option will preclude crop production or wetland operations.

Scoring

Scoring of this criterion ranges from zero to five, with a score of zero representing a low feasibility and score of five representing a high feasibility.

Costs to dischargers

This criterion evaluates the relative administrative cost of compliance (permit costs) and implementation costs associated with each implementation option. The permitting costs used for the evaluation are taken directly from the State Water Board's fee schedule (Title 23, Division 3, Chapter 9 of the California Code of Regulation). The actual cost to dischargers to implement each of the identified alternatives is given in Section 5 and supporting documentation is contained in Appendix 4.

Scoring

Scoring of this criterion ranges from zero to five, with a score of zero representing a high economic cost to dischargers and score of five representing a low economic cost to dischargers.

State Cost

This criterion evaluates the relative cost to state government for each implementation option. Cost considerations include: cost, if any, to develop new regulations or regulatory programs; cost associated with development, compliance and enforcement of permits or other regulatory controls. Regional Board staff resources comprise the majority of these costs.

Scoring

The administrative costs associated with each control option is estimated in Appendix 4 and scored in this staff report on a relative basis. Scoring of this criterion ranges from zero to five, with a score of zero representing a high economic cost to state government and score of five representing a low economic cost to state government.

Flexibility

This criterion evaluates the degree to which a given control action can respond or adapt to new data and information. The criterion also evaluates the degree to which each implementation option provides flexibility to growers and wetland operators in meeting salt and boron limits.

Scoring

The flexibility of each control action is evaluated qualitatively and scored based on best professional judgment. Each of the control options will be evaluated relative to one other and scored on scale of zero to five, with zero being the least flexible and five being the most flexible.

Time Needed to Implement

Certain options will depend on additional regulatory actions by the Regional Board or other entities and will require time to develop the implementation program (for a program that is not currently in place). This evaluation criterion is not intended to analyze the time it will take to achieve water quality standards, but rather the time needed to develop and implement a given option. For example the time needed to develop and implement a prohibition of discharge would include the time required to draft and adopt the necessary Basin Plan amendment language, however, it would not include the time needed to actually implement the prohibition (e.g., cessation of drainage discharge).

Scoring

An estimate of the time required to establish the implementation framework of a given alternative will be made. Scoring for this evaluation criterion will range from zero requiring the most time to implement and five requiring the least time to implement.

Likelihood of Success

The likelihood that a given control options will be successful as a stand alone measure or as part of an combination of measures will depend on its feasibility, cost to implement, flexibility, the time needed to implement the option, and its' consistency with existing laws and policies. Likelihood of success is a summary criterion that integrates the above described criteria and provides a relative ranking of each available control option, with the goal of identifying the best options.

Scoring:

Scoring for this criterion is calculated by adding the scores from the above-listed criteria. Higher scores indicate a greater likelihood of success and lower scores indicate a lower likelihood of success.

Consistency with State and Federal Laws and Policies

Each implementation option is evaluated with respect to key state and federal laws and policies as described below. Each option will be identified as either being supportive, neutral, or inconsistent with policies evaluated below.

Porter-Cologne

Porter-Cologne requires the establishment of a program of implementation to meet water quality objectives. Porter-Cologne provides the Regional Boards with three general mechanisms for regulating the discharge of waste to waters of the State: WDRs; waivers of WDRs; and conditional prohibitions of discharge. The implementation options will be evaluated with respect to their consistency with the regulatory framework described in Porter-Cologne.

NPS Management Plan

The Nonpoint Source Management Plan includes a three-tier process for implementation of best management practices: Tier 1: Self-Determined Implementation of Management Practices [formerly referred to as “voluntary” implementation]; Tier 2: Regulatory Based Encouragement of Management Practices; and Tier 3: Effluent Limitations and Enforcement Actions. The lowest “tier” that is likely to result in attainment of water quality standards is to be used. Higher “tiers” are to be used for persistent or more difficult water quality problems. “Tier 1” relies on voluntary efforts to adopt improved management practices; “tier 2” relies on incentives such as waivers of WDRs to encourage adoption of management practices and the use of Memorandums of Understanding (MOUs) and MAAs to facilitate coordination among agencies; and “tier 3” relies on adoption and enforcement of WDRs. The NPS management plan will be interpreted to give preference to options, which involve lower tier action, however, upper tier (i.e., tier 3) actions, such as issuance of NPDES permits will not be deemed inconsistent with the NPS with the policy.

Basin Plan Policies

Each of the control options will also be evaluated for consistency with the following relevant Regional Board and State Water Board policies:

Regional Board Policies

- 1) The Water Quality Limited Segment Policy
- 2) Watershed Policy
- 3) Policy for Obtaining Salt Balance in the San Joaquin Valley

State Water Board Policies

- 1) Nonpoint source Management Plan
- 2) Antidegradation Implementation Policy
- 3) The State Policy for Water Quality Control
- 4) Statement of Policy with Respect to Maintaining High Quality of Water in California

These policies are summarized in the Basin Plan and in Section 3.1.1 above.

Scoring

Each option will be determined to be supportive (+), neutral (0), or inconsistent (-) with the above-referenced policies. Any implementation option determined to be inconsistent

with a relevant policy may be eliminated from consideration. The full evaluation of policy consistency is contained in Appendix 3.

4.4.5 Evaluation of Salt and Boron Implementation Options

The objective of this section is to describe the range of regulatory and non-regulatory implementation options available to the Board to control salt and boron discharges. The implementation options consist of administrative or institutional tools as opposed to actual on-the-ground implementation practices. This section includes discussion of the potential options that are available to the Regional Board to control salt and boron discharges. Each implementation option is evaluated using the criteria presented in Section 3.4.4. The implementation options are broken down into the following general categories

- 1) Regulatory implementation options, which use the Board's regulatory authority to restrict or eliminate discharges
- 2) Non-regulatory implementation options, which rely on self-regulation or encouragement of discharge reduction through incentives such as grant funding, and formal cooperating agreements established through MOUs or MAAs

The section concludes with a relative ranking or scoring of all of the identified implementation options and identification of what are considered to be the best available options for controlling salt and boron discharges. The identified implementation options will be used to formulate a series of alternatives. Alternatives may consist of a no project alternative, a single implementation option, or a combination of implementation options. Each of the alternatives are described and evaluated in Sections 4.3.1 and 4.3.2.

Regulatory Implementation Options

This section describes regulatory mechanisms available to the Regional Board that could be used as part of a salt and boron control program. The following series of implementation options explain how each regulatory mechanism could be used.

Prohibition

When necessary, the Board can prohibit certain waste discharges (Water Code § 13243). These prohibitions can apply to types of wastes and/or to specific areas.

Option 1: Prohibition of discharge from all agricultural return flows and wetlands

The Regional Board would prohibit the discharge of salt and boron to the LSJR or its tributaries from all agricultural and wetland sources. Such a prohibition would fully implement the salt and boron base load allocations set forth in the TMDL.

Example Basin Plan Language:

The discharge of salt and boron in agricultural subsurface drainage, agricultural surface drainage, and drainage from managed wetlands to the San Joaquin River or its tributaries is prohibited.

Evaluation of Option 1: Prohibition of Discharge from all agricultural return flows and wetlands		
Factor	Justification	Score
Feasibility	Prohibition of discharge has successfully been used to control selenium discharges in agricultural drainage in the Grassland Watershed. This option would rely on existing technology and therefore it is technically feasible, however, widespread prohibition of discharge to control salt and boron would be overly restrictive and likely result in decreased agricultural productivity from salt build up in soils and shallow groundwater. Full prohibition of discharge would minimize salt exports from the San Joaquin Basin and could result in a net salt build-up, therefore, this control option is not considered to be feasible.	0
Discharger Cost	High - No permitting or administrative fees would apply to a prohibition of discharge. Cost of implementation would be high as all discharges would require treatment.	0
State Cost	Medium - Compliance monitoring, regulatory oversight, and some enforcement would be required. Estimated 2-5 personnel years per year would be required for program development and oversight (Appendix 4).	3
Flexibility	Low-Option has little flexibility and does not allow for adaptive management, as discharges would be prohibited at all times and at all locations.	0
Time needed to implement	Prohibitions of discharge are already contained in the Basin Plan. A new prohibition of discharge for salt and boron could be developed in a relatively short amount of time (approximately 1 year). Regional Board oversight and follow-up needed to address dischargers not in compliance could require significant resources.	4
Likelihood of Success	This option is considered to have a low likelihood of success because it is neither feasible nor flexible. This option does not facilitate a salt balance in the LSJR watershed and could have negative impact on both agricultural productivity and long-term water quality.	8
Consistent with Laws and Policies	See Appendix 3	No

Option 2: Geographically focused prohibition of discharge from all agricultural return flows and wetlands

The Regional Board could prohibit the discharge of salt and boron to the LSJR or its tributaries from all agricultural and wetland NPS discharges from a specific geographic area.

Example Basin Plan Language:

The discharge of salt and boron from agricultural subsurface drainage, agricultural surface drainage, and drainage from managed wetlands from the Grassland and Northwest Side subareas to the San Joaquin River from any on-farm or wetland subsurface drain, surface drain, or other drainage conveyance system is prohibited.

Evaluation of Option 2: Geographically focused prohibition of discharge from all agricultural return flows and wetlands		
Factor	Justification	Score
Feasibility	Prohibition of discharge has successfully been used to control selenium discharges in agricultural drainage in the Grassland Watershed. This option would rely on existing technology and therefore it is technically feasible. This option is considered to be more feasible than option 1 (Prohibition of Discharge from <u>all</u> agricultural return flows and wetlands) because the areas affected by the prohibition could be limited by targeting priority areas.	3
Discharger Cost	Medium to High - No permitting or administrative fees would apply to a prohibition of discharge. Cost of Compliance would be high in targeted areas because all discharges would need to be treated (retained) in those areas. The overall cost to implement, however, would be lower than for option 1.	2
State Cost	Medium - Compliance monitoring, regulatory oversight, and some enforcement would be required. Estimated 2 to 5 personnel years per year would be required for program development and oversight (Appendix 4).	3
Flexibility	This option provides substantial flexibility to areas that are deemed to be low priority and outside of the prohibition. Geographic areas within the prohibition area, however, would have little flexibility.	3
Time needed to implement	Prohibitions of discharge are already contained in the Basin Plan. A new prohibition of discharge for salt and boron could be developed in a relatively short amount of time (approximately 1 year). Regional Board oversight and follow-up needed to address dischargers not in compliance could require significant resources.	4
Likelihood of Success	This option does not facilitate a salt balance in the LSJR watershed and could have negative impact on both agricultural productivity and long-term water quality in areas affected by the prohibition.	16
Consistent with Laws and Policies	See Appendix 3	Yes

Option 3: Limited Prohibition of discharge from irrigation return flows and wetlands return flows

A prohibition of salt and boron discharges to the LSJR basin that are in excess of the load allocations or a concentration based threshold could be added to the Basin Plan. Such a prohibition would provide the regulatory mechanism needed to enforce the TMDL load allocations. A limited prohibition could either be applied to the entire LSJR watershed as in option 1 or to selected high priority areas as in option 2.

Example Basin Plan Language:

The discharge of salt and boron in agricultural subsurface drainage, agricultural surface drainage, and drainage from managed wetlands, that are in excess of the load allocations contained in the control program for salt and boron discharges to the lower San Joaquin River, from any on-farm or wetland subsurface drain, surface drain, or other drainage conveyance system is prohibited.

Evaluation of Option 3: Limited Prohibition of discharge from irrigation return flows and wetlands return flows		
Factor	Justification	Score
Feasibility	Prohibition of discharge has successfully been used to control selenium discharges in agricultural drainage in the Grassland Watershed. Similar to options 1 and 2, this option would rely on existing technology and therefore it is technically feasible. It would not be feasible for staff to determine if discharges were in compliance with load allocations because sufficient monitoring data is not available and dischargers would not necessarily be required to characterize their discharges.	0
Discharger Cost	Low - No permitting or administrative fees would apply to a prohibition of discharge. Cost to implement would be relatively low compared to option 1 and 2 because only a portion of the salt and boron load generated would need to be treated-some loading would be allowed.	4
State Cost	High - Compliance monitoring, regulatory oversight, and some enforcement would be required. Estimated 4 to 5 personnel years per year would be required for program development and oversight. The burden of determining compliance with load allocations would be placed entirely on the State.	1
Flexibility	This option provides some flexibility to all dischargers since drainage in compliance with load allocations would be allowed. The prohibition could be updated if new TMDLs were promulgated based on new information. It is anticipated that the areas that have historically discharged the largest salt and boron loads (Grassland and Northwest side subareas) would have the most difficulty in meeting the prohibition.	4
Time needed to implement	Prohibitions of discharge are already contained in the Basin Plan. A new prohibition of discharge for salt and boron could be developed in a relatively short amount of time (approximately 1 year). Regional Board oversight and follow-up needed to identify and address dischargers not in compliance would require a large amount of time and resources.	1
Likelihood of Success	This option has a relatively high likelihood of success. This option provides some limited opportunities for salt drainage and salt export from the San Joaquin River watershed and will result in a reasonable likelihood of meeting water quality objectives.	10
Consistent with Laws and Policies	See Appendix 3	Yes

National Pollutant Discharge Elimination System (NPDES) Permits

The Federal Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to provide a mechanism to regulate point-source waste discharges into surface waters of the United States. In California, the nine Regional Boards administer the NPDES program. NPDES permits are typically issued to regulate point-source municipal and industrial discharges to surface waters, such as discharges from publicly owned waste water treatment facilities or privately owned facilities that discharge at discrete locations.

Major point source discharges contributing salt and boron include municipal wastewater treatment facilities. Minor point source discharges of salt and boron to the LSJR include groundwater cleanup systems, fish hatcheries, and others. On average, point source discharges from municipal and industrial sources only account for approximately 2 percent of the total salt load of the San Joaquin River (Appendix 1). These loads, however, are expected to increase with population growth. Effluent flows and associated

salt loading from wastewater treatment plant discharges generally remain stable and independent of hydrologic cycles, therefore, the relative contribution of salt loading from wastewater treatment facilities increases during drier year types when LSJR flows are low. A list of the NPDES permitted municipal wastewater facilities is provided in Table 4-4.

NPDES permits for municipal dischargers generally contain the following requirement “[t]he discharger shall use the best practicable treatment or control technique currently available to limit mineralization to no more than a reasonable increment.” As NPDES permits are renewed, dischargers with elevated effluent salinity or who discharge to receiving waters with salinity problems are required to conduct studies of salt sources within their collection systems and develop salinity reduction plans that may contain one or more of the following elements:

- 1) Economic feasibility of potential salt and boron control options including source abatement, pretreatment processes and treatment options;
- 2) Proposed actions to control salt and boron discharges;
- 3) Proposed long term monitoring program;
- 4) Timeline of future work; and
- 5) Analyses of impact to ground and surface water quality.

Table 4-4: Wastewater Treatment Plants in the Lower San Joaquin River Watershed

Facility	Effluent Flow Rate (mgd)	Direct Discharge to SJR (Y/N)	Salinity reduction plan due by
City of Modesto	30.0	Yes	May 2004
City of Turlock	11.4	Yes	TBD-permit overturned
City of Merced	7.1	No	No plan required
City of Atwater	3.3	No	No plan required
City of Newman	1.2	No	No plan required
City of Gustine	0.8	No	No plan required
City of Patterson	0.8	No	No plan required
City of Planada	0.3	No	No plan required

Option 4: Continued NPDES regulation of point source discharges

The approach being taken to address point source dischargers is to initially focus on municipal and industrial (M&I) sources that discharge directly to surface waters. M&I sources that discharge to land will be deferred to subsequent phases of the TMDL. The TMDL establishes waste load allocations for the Cities of Turlock and Modesto, the two wastewater treatment plants that discharge directly to surface water in the LSJR watershed. These initial waste load allocations may be reduced based on the results of the salinity control plans developed for each facility. NPDES permits for the Cities of Turlock and the Modesto will be revised to incorporate the TMDL salt load allocations (limits). Current NPDES permits for the cities of Turlock and Modesto have established interim performance goals that include load limits. The TMDL load allocations, if implemented, would constitute a significant reduction in allowable salt loading from these facilities compared to the existing interim limits.

Return flows from irrigated agriculture are not considered to be point sources under the CWA and the CWA specifically exempts irrigation return flows from the NPDES. NPDES permits, therefore, cannot be used as a mechanism to regulate nonpoint source salt and boron loads, which account for the vast majority of the controllable salt and boron loading to the LSJR.

Example Basin Plan Language:

No new Basin Plan language is needed as this implementation option consists of continuation of an existing program already contained in the Basin Plan. The Basin Plan and most existing NPDES permits already contain provisions for regulating point source discharges in a manner consistent with TMDLs.

Evaluation of Option 4: NPDES regulation of point source discharges		
Factor	Justification	Score
Feasibility	Point source discharges to the San Joaquin River are currently being regulated under the NPDES. NPDES permits contain interim salt load limits that can be modified to coincide with waste load allocations	5
Discharger Cost	Low – Permitting costs are already incurred by the dischargers and changes to the permits would not require any significant increase in the administrative costs or fees associated with the existing permits.	5
State Cost	Low – Permit oversight is already conducted by the Regional Board and only marginal increases in oversight is expected as a result of implementing waste load allocations for salt	4
Flexibility	High - This option is flexible since initial waste load allocations are being set equal to historical loading from affected dischargers. Point source dischargers will identify and report on opportunities to reduce salt loading prior to reducing load allocations. No loading will be allowed during critical periods when no loading capacity is available.	4
Time needed to implement	Low - NPDES permits are already in place and are a required element of the Regional Boards water quality management program.	5
Likelihood of Success	High - Likelihood of success is high given the track record for controlling point source discharges through NPDES permits.	23
Consistent with Laws and Policies	See Appendix 3	Yes

Waste Discharge Requirements - Individual

Pursuant to the Porter-Cologne Water Quality Control Act (Water Code § 13260 et seq.) the Regional Board has the authority to issue individual or general WDRs, which govern the amount of pollution that can be discharged to a water body. Any person discharging waste or proposing to discharge waste is required to submit a report of waste discharge (ROWD) to the appropriate Regional Board. A Regional Board may also initiate the permit process by requesting a ROWD from an individual or entity. The Board also has the authority to require dischargers to prepare technical reports providing information related to a discharge and its impacts (Water Code § 13267).

Unlike NPDES permits, WDRs can be applied to waste discharges to land, groundwater, and from nonpoint source discharges to surface waters, including agricultural drainage. WDRs can be issued to parties discharging wastes, including individuals, agencies such as water districts, or companies. WDRs can specify the volume of discharge and set

concentration and load limits on the constituents discharged. They can also set receiving water limits, the allowable concentration of a pollutant in the receiving water downstream of the discharge. The Board can require ongoing discharger compliance monitoring as a permit requirement. Where discharge limits in WDRs cannot be met at the time of adoption, the Board also adopts a Cease and Desist Order that specifies steps that must be taken and a timeline that must be followed to bring the discharge into compliance.

WDRs could have an important role in the implementation of the salt and boron TMDL as they are the primary regulatory mechanism, available to the Regional Board that can be used to address nonpoint source discharges. Additionally WDRs would be effective because specific load limits or effluent limits could be incorporated into each permit.

Option 5: Adoption of WDRs for individual landowners

The Regional Board would issue WDRs to individual landowners discharging salt or boron to the LSJR or its tributaries.

Example Basin Plan Language:

Salinity effluent limits equivalent to the base load allocations contained in the control program for salt and boron discharges to the lower San Joaquin River will be established in WDRs for all surface discharges to the San Joaquin River or its tributaries from agricultural lands and managed wetlands within the LSJR watershed. WDRs will be issued to the owner and/or operator of the land from which the discharge originates.

Evaluation of Option 5: Adoption waste discharge requirements for individual landowners		
Factor	Justification	Score
Feasibility	High - The Regional Board routinely issues WDRs to control discharges to groundwater and surface waters. WDRs can be used to regulate discharges from agriculture and other non-point sources. WDRs have successfully been used to control selenium discharges and implement a TMDL for selenium in the Grassland Subarea. WDRs contain effluent limits that can be set equal to load allocations contained in the salt and boron control program so there is a high degree of control over individual dischargers and certainty that water quality objectives will be met.	5
Discharger Cost	High – Administrative costs are high as there are an estimated 9,000 farms in the Lower San Joaquin River Watershed that would need to be regulated under individual WDRs. Administrative cost of compliance would be approximately \$3.6 million based on an administrative cost (permit costs) of \$400.00 to each farm. Additionally, cost of compliance would be high, as individual landowners would have to conduct compliance monitoring and reporting and incur the capital cost of implementation infrastructure at the field or parcel level.	0

Evaluation of Option 5: Adoption waste discharge requirements for individual landowners (CONTINUED)		
State Cost	High – Extensive staff oversight would be needed to develop WDRs review self-monitoring data submitted from dischargers and conduct routine inspections. An estimated 200 personnel years (PYs) per year would be required over a ten-year period for program development and administration (Appendix 4). These staffing levels far exceed available resources; therefore this option is not feasible from state cost perspective unless it could be offset by fees.	0
Flexibility	Low- Flexibility is limited since load allocations are set at the farm or parcel scale. Provides limited incentive and opportunity for regional scale drainage management. Dischargers would be required to meet static load allocations pre-determined in WDRs and opportunities to manage export salts would be minimized. Areas that are not contributing to the problem are potentially responsible for complying with WDRs.	0
Time needed to implement	High – The time needed to develop individual WDRs at the farm or parcel level would be excessive given the staff resources available.	0
Likelihood of Success	Low- This option has a low likelihood of success because regulatory effort and discharger expenditures would be diluted over a 2.9-million acre area, while rectification of the salt problem requires focused action. Discharger and state costs are excessive.	5
Consistent with Laws and Policies	See Appendix 3	No

Option 6: Adoption of waste discharge requirements for public water agencies

Individual permits would be issued to public water agencies that have jurisdiction over irrigation and drainage operations for large areas in the watershed. Approximately 84% of the agricultural land in the LSJR watershed is located within the jurisdiction of various public water agencies. Agricultural lands not located within public water agency jurisdictions, however, would need to be addressed through individual permits issued directly at the farm or parcel level.

Example Basin Plan Language:

Salinity effluent limits equivalent to the TMDL load allocations will be established in WDRs for all surface discharges to the San Joaquin River or its tributaries from agricultural lands and wetlands within the LSJR watershed. WDRs will be issued to public water agencies for discharges originating from within their geographic boundaries.

Evaluation of Option 6: Adoption of waste discharge requirements for public water agencies		
Factor	Justification	Score
Feasibility	High - The Regional Board routinely issues WDRs to control discharges to groundwater and surface waters. WDRs can be used to regulate discharges from agriculture and other non point sources. WDRs have successfully been used to control selenium discharges and implement a TMDL for selenium in the Grassland Subarea. WDRs contain effluent limits that can be set equal to load allocations contained in the salt and boron control program so there is a high degree of control over dischargers and certainty that water quality objectives will be met.	5
Discharger Cost	Medium – Administrative costs associated with issuance of WDRs at the water district scale are relatively low compared to issuance of WDRs to individual landowners (option 5). There are approximately 30 public water agencies with jurisdiction in the LSJR Watershed that would potentially be regulated with WDRs under this option. Administrative cost of compliance would be approximately \$60,750 per year, applying an annual administrative cost (permit cost) of \$2025.00 to each public water agency. Additionally, cost of compliance for applying WDRs at public water agency (water district) scale could be reduced through cost sharing of water quality planning, monitoring activities, construction of capital improvements, and operation and maintenance of implementation practices.	3
State Cost	Medium –Staff oversight would be needed to develop WDRs review self-monitoring data submitted from dischargers and conduct routine inspections. An estimated 6 PYs would initially be needed for program development and approximately 3 PYs per year would be needed for permit oversight after initial start up (Appendix 4).	3
Flexibility	Medium- This option provides incentive and opportunity for regional scale drainage management. Dischargers would, however, be required to meet static load allocations pre-determined in WDRs thereby limiting opportunities to export salts. Areas that are not contributing to the problem are potentially responsible for complying with WDRs. Option 6 is considered to be more flexible than Option 5.	2
Time needed to implement	Medium - The time needed to develop and manage WDRs at the pubic water agency scale is estimated to be approximately 1 to 2 years.	3
Likelihood of Success	Medium - This option has a greater likelihood of success than issuance of WDRs to individual landowners (Option 5). Regulatory effort and discharger expenditures, however would not necessarily be focused on the most important pollution sources.	16
Consistent with Laws and Policies	See Appendix 3	No

Option 7: Geographically focused waste discharge requirements

The Regional Board would issue WDRs to individual landowners and/or public water agencies located in specific geographic areas identified as posing a high threat to water quality. Focused WDRs would be designed to focus resources and regulatory actions on high priority areas or categories of discharges.

Example Basin Plan Language:

Salinity effluent limits equal to the base load allocations contained in the control program for salt and boron discharges to the lower San Joaquin River will be

established in WDRs for all surface discharges to the San Joaquin River or its tributaries from agricultural lands and managed wetlands within any subarea identified as high priority subarea.

Evaluation of Option 7: Geographically focused waste discharge requirements		
Factor	Justification	Score
Feasibility	High - The Regional Board routinely uses WDRs to control discharges to groundwater and surface waters. WDRs can be used to regulate discharges from agriculture and other nonpoint sources. WDRs have successfully been used to control selenium discharges and to implement a TMDL for selenium in the Grassland Subarea. WDRs contain effluent limits that can be set equal to load allocations contained in the salt and boron control program so there is a high degree of control over dischargers and certainty that water quality objectives will be met.	5
Discharger Cost	Low to Medium – Administrative costs associated with issuance of WDRs, to individual landowners or public water agencies in focused high priority subareas are relatively low compared to widespread issuance of WDRs to individual landowners or public water agencies throughout the entire LSJR Basin (options 5 and 6). It is anticipated that the overall cost of compliance with this option would be relatively low since only high priority pollution sources would be targeted. Cost of compliance, however would be high for those targeted dischargers. Similar to option 6, cost of compliance for applying WDRs at public water agency (water district) scale could be reduced through cost sharing of water quality planning, monitoring, construction of capital improvements, and operation and maintenance of implementation practices.	4
State Cost	Low –Staff oversight would be needed to develop WDRs, review self-monitoring data submitted from dischargers and conduct routine inspections. An estimated 2 PYs would initially be needed for program development and approximately 3 PYs per year would be needed for permit oversight after initial start up. Available resources could be focused on the most important pollution sources.	5
Flexibility	Medium to High- This option provides incentive and opportunity for regional scale drainage management in high priority areas and self directed compliance in low priority areas. Targeted dischargers would be required to meet static load allocations pre-determined in WDRs and opportunities to manage export salts would be minimized.	4
Time needed to implement	Low –Development and management of WDRs in high priority areas could occur within 1-3 years after the adoption of the control program. Issuance of WDRs for individuals or public water agencies located in lower priority areas would occur later.	5
Likelihood of Success	High- This option has a high likelihood of success because regulatory effort and discharger expenditures would be focused on the most important pollution sources.	23
Consistent with Laws and Policies	See Appendix 3	Yes

Option 8: Adoption of waste discharge requirements for the USBR/CVP

The Regional Board would adopt a WDR for the USBR for all imported water delivered to the LSJR watershed through the CVP.

Example Basin Plan Language:

Salinity effluent limits equal to the DMC load allocations contained in TMDL for salt and boron in the lower San Joaquin River will be established in WDRs issued to the U.S. Bureau of Reclamation (USBR) for water imported to the LSJR from the Delta via the Central Valley Project. The USBR will be responsible to mitigate any salt discharges in excess of the limits specified in their WDR. Mitigation for excess salts can include, but is not limited to, providing additional flows to increase assimilative capacity or by reducing saline discharges from other sources in the LSJR watershed.

Evaluation of Option 8: Adoption of waste discharge requirements for the USBR/CVP		
Factor	Justification	Score
Feasibility	High - The Regional Board routinely issues WDRs to control discharges to groundwater and surface waters. WDRs contain effluent limits that can be set equal to load allocations contained in the salt and boron control program so there is a high degree of control over dischargers and certainty that water quality objectives will be met.	5
Discharger Cost	Medium - This option would consist of issuing a single WDR to a single discharger, therefore the administrative costs would be low relative to the magnitude of the discharge. Cost of compliance with DMC load allocations, however, could be high. The State Water Board's Water Rights Decision 1641 already places responsibility on the USBR to take action to meet the existing salinity water quality objectives at Vernalis. Meeting DMC salt load allocations could place increased responsibility on the USBR (beyond that required by D-1641). Additional dilution flows or mitigation could be needed.	3
State Cost	Low - Staff oversight would be needed to develop a WDR and to review self-monitoring data submitted from the USBR. The staff resources needed to develop and administer WDRs for USBR salt loads in the DMC are estimated to be approximately 0.5 PYs per year. This represents a small investment in resources to gain control over one of the largest salt sources in the LSJR watershed.	5
Flexibility	Medium – This option would be as flexible as permit conditions allow.	3
Time needed to implement	Medium - Development and management of a WDR for the DMC could occur within approximately 1-2 years of adoption of the control program.	3
Likelihood of Success	High - This option has a high likelihood because regulatory effort and discharger expenditures would be focused on a single pollution source that has been identified as a high priority.	19
Consistent with Laws and Policies	See Appendix 3	Yes

Waste Discharge Requirements - General

In addition to individual WDRs, the Regional Board can issue general WDRs that are prepared to address a class of dischargers (i.e., the Board has a general permit that applies to dairies).

Porter-Cologne specifies that the State Water Board or the RWQCBs can adopt general WDRs for a category of discharge when the following findings can be made.

- 1) *The discharges are produced by the same or similar operations*
- 2) *The discharges involve the same or similar types of waste*
- 3) *The discharges require the same or similar treatment standards*
- 4) *The discharges are more appropriately regulated under general discharge requirements than individual discharge requirements*

Option 9: Adoption of general waste discharge requirements for individual agricultural and wetland dischargers

The Regional Board would adopt a general WDR to regulate discharges from individual farms and wetland operations in the LSJR. Regulating multiple agricultural and wetland dischargers under one permit would significantly reduce the administrative workload associated with permitting individual dischargers. Applicants would be required to submit a Notice of Intent (NOI) to comply with the conditions specified in the general WDRs, including provisions for monitoring, drainage planning, and implementation of structural and operational management practices to control salt and boron. Salt and boron load allocations would be specified in general WDRs based on acreages of nonpoint source land use under the control of each applicant.

Example Basin Plan Language:

The General WDRs shall apply to all landowners discharging agricultural and/or wetland drainage to the LSJR and its tributaries. All agricultural and wetland dischargers shall file a NOI to comply with the general WDRs. Dischargers covered under the general WDRs shall comply with the permit conditions and the unit-area effluent limits specified in the TMDL for salt and boron dischargers in the LSJR.

Evaluation of Option 9: Adoption of general waste discharge requirements for individual agricultural and wetland dischargers		
Factor	Justification	Score
Feasibility	High - The State Water Board and the Regional Board routinely use general WDRs to regulate discharges to groundwater and surface waters for specific “classes” of discharge. Construction, industrial, and municipal storm water discharges, for example, are currently regulated under general WDRs. General WDRs could also be used to regulate discharges from agriculture and other non-point sources. General WDRs could contain effluent limits that can be set equal to load allocations contained in the salt and boron TMDL so there is a high degree of control over individual dischargers and certainty that water quality objectives would be met.	5
Discharger Cost	High – Administrative costs are high as there is an estimated 9,000 farms in the LSJR watershed that would need to be regulated. Annual administrative cost of compliance would be approximately \$6.3 million dollars applying an administrative cost (permit costs) of \$700 to each farm. Additionally, cost of compliance would be high, as individual landowners would have to conduct compliance monitoring and reporting and incur capital cost of implementation infrastructure at field or parcel level.	0

Evaluation of Option 9: Adoption of general waste discharge requirements for individual agricultural and wetland dischargers (CONTINUED)		
State Cost	Medium to High – A relatively small amount of staff time would be needed to develop general WDRs because many dischargers could be regulated under a single permit. Staff oversight would, however, be needed to review drainage management plans and self-monitoring data to determine permit compliance. Routine inspections and follow up would also be needed to address dischargers that are not in compliance. Initial program development is estimated to require approximately 1PYs; however, it is estimated that an additional 21 PYs per year would be required for program oversight and administration (Appendix 4). These staffing levels exceed available resources; therefore this option is not feasible from a state cost perspective.	2
Flexibility	Low- Flexibility is limited since load allocations are set at the farm or parcel level. Provides limited incentive and opportunity for regional scale drainage management. Areas that are not contributing to the problem are potentially responsible for complying with general WDRs.	0
Time needed to implement	High – Implementation would require more resources than are available in the foreseeable future.	2
Likelihood of Success	Medium- This option has relatively low likelihood of success because regulatory effort and discharger expenditures would be diluted over a 2.9-million acre area, while rectification of the salt problem requires focused action. Additionally, discharger costs are relatively high and time to implement is long.	9
Consistent with Laws and Policies	See Appendix 3	No

Option 10: Adoption of general waste discharge requirements for public water agencies

The Regional Board would adopt general WDRs to regulate salt and boron discharges from public water agencies with jurisdiction in the LSJR. Individual farmers and wetland operators would be represented by their respective public water agency (local water/irrigation district). Public water agencies would be responsible for coordinating water quality management activities for their constituents and for ensuring that all of the conditions of the general WDRs are met.

Public water agencies that provide drainage service or own or operate drainage facilities may be legally responsible for drainage originating from their jurisdictions. Other public water agencies may have no legal responsibility but may nevertheless choose to serve in a drainage management capacity to reduce individual costs to their members. In these cases it is the role of the individual discharger to request that their water agency volunteer to represent them, and in cases where this does not occur, regulation will occur on the farm level.

Example Basin Plan Language:

General WDRs shall apply to all public water agencies discharging agricultural drainage or drainage from managed wetlands to the LSJR. Public water agencies include, but are not limited to, irrigation districts, county water districts, reclamation districts, drainage districts, and municipal water districts. Public

water agencies shall file a NOI to comply with the conditions of the general WDRs and the unit-area effluent limits specified in the TMDL for salt and boron in the Lower San Joaquin River.

Evaluation of Option 10: Adoption of general waste discharge requirements for public water agencies		
Factor	Justification	Score
Feasibility	High - The State Water Board and the Regional Board routinely uses general WDRs to regulate discharges to groundwater and surface waters for specific “classes” of discharge. Construction, industrial, and municipal storm water discharges, for example, are currently regulated under general WDRs. General WDRs could also be used to regulate discharges from agriculture and other non point sources. General WDRs could contain effluent limits set equal to the load allocations contained in the salt and boron control program so there is a high degree of control over individual dischargers and certainty that water quality objectives would be met.	5
Discharger Cost	Medium – Administrative costs are relatively low as there are approximately 30 public water agencies in the LSJR watershed that would need to be regulated. Annual administrative cost of compliance would be approximately \$21,000 dollars applying an administrative cost (permit costs) of \$700.00 to each public water agencies. Cost of compliance would be moderate. Individual landowners would benefit from economy of scale by working through their respective water districts. Additionally, water agencies could take advantage of public funding and financing available through various loan and grant programs. Water districts would be required to conduct compliance monitoring and reporting and incur capital cost of implementation infrastructure at a regional level.	3
State Cost	Medium to Low– A relatively small amount of staff time would be needed to develop a general WDRs because many dischargers could be regulated under a single permit, however, staff oversight would be needed to review drainage management plans and self-monitoring data to determine permit compliance. Routine inspections and follow up would also be needed to address dischargers that are not in compliance. Initial program development is estimated to require approximately 1PY. Additionally, it is estimated that 4 PYs per year would be required for program oversight and administration (Appendix 4).	4
Flexibility	Medium- Since load allocations are set at a regional scale there is opportunity for local control and flexibility in managing discharges, however, areas that are not contributing to the problem are potentially responsible for complying with general WDRs.	3
Time needed to implement	Medium –Approximately one year would be needed to develop a general WDR applicable to public water agencies.	5
Likelihood of Success	Medium- This option has a relatively high likelihood of success because state costs and discharger costs are moderated by working at the regional level as opposed to regulation of individual dischargers.	20
Consistent with Laws and Policies	See Appendix 3	No

Option 11: Adoption of geographically focused general waste discharge requirements

Separate general permits would be adopted for each of the seven geographic subareas delineated in the control program for salt and boron discharges to the LSJR. Each subarea permit would be tailored to the specific needs of the area being addressed. Adoption and

implementation of each general WDR would be scheduled based on the unit-area loading from each subarea and the priority system specified in the control program for salt and boron discharges to the LSJR with the intention of addressing areas posing the greatest threat to water quality first. The general permits would be applied to either individual dischargers or to public water agencies with jurisdiction in each subarea.

Example Basin Plan Language:

General WDRs shall apply to all public water agencies discharging agricultural drainage or drainage from managed wetlands to the LSJR. Public water agencies include, but are not limited to, irrigation districts, county water districts, reclamation districts, drainage districts, and municipal water districts. Public water agencies shall file a NOI to comply with the conditions of the general WDRs in accordance with dates contained in the schedule of compliance for meeting load allocations. Public water agencies shall be considered in compliance with the general WDRs when the unit-area effluent limits specified in the control program for salt and boron discharges into the Lower San Joaquin River are being met.

Evaluation of Option 11: Adoption of geographically focused general waste discharge requirements		
Factor	Justification	Score
Feasibility	High - The State Water Board and the Regional Board routinely use general WDRs to regulate discharges to groundwater and surface waters for specific “classes” of discharge. Construction, industrial, and municipal storm water discharges, for example, are currently regulated under general WDRs. General WDRs could also be used to regulate discharges from agriculture and other non point sources. General WDRs could contain effluent limits set equal to the load allocations contained in the salt and boron control program so there is a high degree of control over regional discharges and certainty that water quality objectives would be met.	5
Discharger Cost	Low – Administrative costs are low as there are approximately 10 public water agencies in the LSJR Watershed that would need to be regulated. Annual administrative cost of compliance would be approximately \$7,000 dollars, applying an administrative cost (permit costs) of \$700.00 to each public water agency. Cost of compliance would be moderate. Individual landowners would benefit from economy of scale by working through their respective water districts. Additionally, water agencies could take advantage of public funding and financing available through various loan and grant programs. Water districts would be required to conduct compliance monitoring and reporting and incur capital cost of implementation infrastructure at regional level. Total cost of compliance would be lower than for Option 10 because low threat areas would potentially be “exempt” from compliance.	4

Evaluation of Option 11: Adoption of geographically focused general waste discharge requirements (CONTINUED)		
State Cost	Low– A relatively small amount of staff time would be needed to develop a General WDRs because many dischargers could be regulated under a single permit, however, staff oversight would be needed to review drainage management plans and self-monitoring data to determine permit compliance. Routine inspections and follow up would also be needed to address dischargers that are not in compliance. Initial program development is estimated to require approximately 3 PYs. Additionally, an estimated 2 PYs per year would be required for program oversight and administration (Appendix 1).	5
Flexibility	High- Since load allocations are set at a regional scale, there is opportunity for local control and flexibility in managing discharges. Regulatory activity would be focused on the most important pollution sources.	4
Time needed to implement	Medium –Approximately 1 to 2 years would be needed to develop a general WDR applicable to public water agencies. Staff resource requirements for program administration are reasonable (though not currently available).	5
Likelihood of Success	High- This option has a high likelihood of success because regulatory effort and discharger expenditures would be focused on the most important pollution sources. State costs and discharger costs are relatively low.	23
Consistent with Laws and Policies	See Appendix 3	yes

Waste Discharge Requirements – Waiver

Pursuant to Water Code section 13269 the Regional Board may waive WDRs for a specific discharge or a specific type of discharge if the waiver is not against the public interest. Waivers may not exceed five years in duration but may be renewed by the Regional Board. Waivers must be conditional and may be terminated by the Board at any time.

In July 2003 the Regional Board adopted a conditional waiver of WDRs program for discharges of wastes from irrigated lands to waters of the State. The irrigated lands waiver program is comprised of two conditional waivers of WDR's. *“One Conditional Waiver is for Coalition Groups or other entities, which form on behalf of individual discharges to comply with CWC and Regional Board Plans and Policies. The second Conditional Waiver is for individual Dischargers”* (CVRWQCB, 2003). Irrigated lands are defined in the waivers as *“lands where water is applied for producing crops and, for the purposes of these Waivers, includes, but is not limited to, land planted to row, field and tree crops as well as commercial nurseries, nursery stock production, managed wetlands and rice production”* (ibid). Coalition Groups and individual dischargers apply for coverage under the appropriate waiver by filing a Notice of Intent to comply with conditions set forth in the Waiver. Waiver conditions include provisions requiring Dischargers *“to prepare and implement technical reports to monitor surface water; evaluate, monitor, and implement management practices that result in attainment of receiving water limitations based on water quality objectives; and if directed by the*

Regional Board, implement additional measures to protect water quality” (ibid.). The Regional Board is concurrently in the process of developing a 10-year implementation program to address discharges from irrigated lands. This implementation program includes preparation of an EIR to evaluate alternative for achieving water quality objectives.

Option 12: Implement the salt and boron TMDL through the existing waiver of waste discharge requirements for discharges from irrigated lands

Using this approach, the Regional Board would seek compliance with TMDLs at the subarea or regional level through the existing waiver of WDRs for discharges from irrigated lands. Dischargers would be required to meet load allocations to qualify for a waiver. Additional waiver conditions include requirements for monitoring to assess the sources and impacts of waste discharges, prioritization of pollutant sources, and implementation of management practices to prevent the release of wastes to surface waters. The waiver program includes time schedules for completion of key milestones and submittal of deliverables. Failure of discharger to meet the TMDL load allocations or other waiver conditions would result in the loss of the ability to operate under the waiver and would prompt regulation under a secondary mechanism such as WDRs (i.e., options 5,6,or 7) or prohibition of Discharge (i.e., options 1,2, and/or3).

Evaluation of Option 12: Implementation of the existing waiver of waste discharge requirements for discharges from irrigated lands		
Factor	Justification	Score
Feasibility	High - The State Water Board and the Regional Board has the authority to waive WDRs for specific discharges or types of discharges. Waivers of WDRs can contain conditions, which can provide some assurance that discharges will not impact water quality. The Regional Board can terminate waivers of WDRs at any time. In July of 2003 the Regional Board adopted a Waiver of WDRs for discharges from irrigated land. Low level of regulatory control over dischargers may reduce incentive for compliance and delay attainment of water quality objectives.	4
Discharger Cost	Low – Administrative costs are low as no permit fees apply to entities regulated under waivers of WDRs. Cost of compliance would also be low.	5
State Cost	Low– A waiver program is already being developed for discharges from irrigated lands; therefore, only minor additional staff resources would be needed for program development. Additional resources would be needed to use the existing waiver program as an implementation mechanism for salt and boron control (integration of the existing waiver with the salinity control program). Approximately 1 new PY per year would be needed.	5
Flexibility	High- A waiver, by design, provides flexibility because monitoring data (required by waiver conditions) can be evaluated to guide the implementation actions required from dischargers.	4
Time needed to implement	Low –Approximately one year would be needed for waiver program development.	5
Likelihood of Success	High- This option has a relatively high likelihood of success because state costs and discharger costs are minimized. Certainty in meeting water quality objectives, however, is lower because less regulatory oversight would be used.	23
Consistent with Laws and Policies	See Appendix 3	yes

Option 13: Implementation of a waiver of waste requirements for dischargers participating in a Regional Board approved real-time management program.

The salt and boron TMDL includes opportunities for dischargers to use real time TMDL allocations to facilitate more efficient salt management by reducing drainage and groundwater interactions and by allowing salts to be discharged during times when there is available loading capacity. Failure to allow salt exports from the basin will eventually result in long-term salt buildup in the basin and water quality degradation through uncontrolled groundwater discharges. The real-time load allocations contained in the TMDL are formulaic. Actual allocations would be based on real-time flow and water quality conditions and on a weekly or monthly forecast of assimilative capacity. Implementation of a successful real-time management program will require a formally coordinated effort among the dischargers in the LSJR watershed. Under real time load allocations, it will be the dischargers responsibility to determine the available assimilative capacity of the LSJR and allocate that assimilative capacity among real-time program participants. Point and nonpoint source dischargers will need to develop and maintain the necessary facilities to store, release, and dispose of salts. Monitoring will be needed to meter discharges into the river in accordance with the real-time load allocations prescribed and to ensure that additional salt discharges do not result in water quality violations. Developing a coordinating entity and constructing the facilities needed to store, release, discharge, and dispose of salts will require significant investments from the real-time program participants.

Participation in a real-time water quality program will be entirely voluntary, however, entities choosing to participate in the real-time program will likely be regulated by the Board in some form (i.e., conditional waiver of WDRs). Participation in a real-time program would be offered to dischargers as an alternative to a more stringent regulatory approach such as prohibition of discharge or individual WDRs. Real-time load allocations will generally be greater (less restrictive) than the default TMDL base load allocations, providing participants with the opportunity to increase their discharges.

Example Basin Plan Language:

A discharger will be considered to be in compliance with the control program for salt and boron discharges from irrigated lands in the lower San Joaquin River watershed if: 1) they are participating in a Regional Board approved real-time management program for the control of salt and boron in the lower San Joaquin River in accordance with Regional Board Resolution No. R5-2003-XXXX; and 2) real-time load allocations for salt and boron in the lower San Joaquin River are being met or discharges are occurring in accordance with site specific Regional Board-approved performance goals and milestones.

Evaluation of Option 13: Implementation of a new waiver of waste discharge requirements for participants of a Regional Board approved real-time management program		
Factor	Justification	Score
Feasibility	High - The State Water Board and the Regional Board have the authority to waive WDRs for specific discharges or types of discharges. The waiver would be designed to compliment the existing waiver of WDRs for discharges from irrigated lands and be conditioned upon dischargers complying with real-time load allocations. A real-time management demonstration program in the LSJR watershed was previously established through a multi-agency effort to demonstrate the utility of real-time management, however, physical implementation of real-time management has not been thoroughly tested. Salt exports are maximized to facilitate a watershed salt balance.	5
Discharger Cost	Low – Administrative costs are low as no permit fees apply to entities regulated under waivers of WDRs. Cost of compliance would also be relatively low for dischargers since real-time load allocations would generally be larger than base load allocations. This would reduce the volume of drainage water requiring treatment compared to all other implementation options evaluated	5
State Cost	Low– A waiver program is already being developed for discharges from irrigated lands, however, additional staff resources would be needed to develop a companion waiver for real-time discharges that compliments the existing waiver. Additional resources would be needed for program oversight and administration. Approximately 1 to 2 PYs per year would be needed to implement a real-time based waiver program. These PYs would be needed in addition to the resources required to implement the existing ongoing waiver program for agricultural discharges.	4
Flexibility	High- A waiver, by design, provides flexibility because monitoring data (required by waiver conditions) can be evaluated to guide the implementation actions required from discharges. Real-time managements would provide the maximum flexibility to dischargers because allowable loading would be maximized.	5
Time needed to implement	Low –Approximately one year would be needed for waiver program development.	5
Likelihood of Success	High- This option has a relatively high likelihood of success because state costs and discharger costs are minimized. Real-time management of drainage, however, is an untested implementation practice and high degree of discharger coordination and self-regulation are required.	24
Consistent with Laws and Policies	See Appendix 3	yes

Non Regulatory Control Options

Implementation of the salt and boron TMDL without regulatory control would rely exclusively on voluntary efforts from dischargers. Voluntary efforts to meet water quality objectives consist of those steps taken by dischargers or other entities without the presence of Regional Board regulatory efforts. The Board is often involved in these efforts by providing technical assistance and grant funding to help implement certain aspects of the projects or programs.

Identification of a serious water quality problems and the impending threat of regulatory

or legal action is often a catalyst for effective voluntary actions. Relying on voluntary control actions alone, however, may put dischargers who voluntarily implement water quality controls at an economic disadvantage with those who do not. For example, if one farmer decides to implement tailwater capture and re-use systems to reduce discharges to the LSJR, that farmer incurs the cost of the pollution control while competing farmers may not incur such costs in the absence of regulatory control. Creating economic incentives to implement voluntary controls could remedy this problem but this is beyond the purview of the Regional Board. By strategically implementing regulatory controls, all dischargers that contribute salt and boron loads to the LSJR would be responsible for control or mitigation commensurate with the quantity and quality of their discharge.

Option 14: Promote voluntary efforts to comply with water quality objectives

The Board could make a more proactive effort to achieve compliance through voluntary steps by setting up a watershed-based effort to control salt and boron. The proactive effort could include promotion and participation in:

- 1) Efforts by water agencies to conduct analysis of salt/boron controls
- 2) Local efforts initiated by the Farm Bureau and non-governmental organizations or other stakeholder groups

Following the watershed approach, staff would primarily provide technical assistance, administer funding that may be available through the federal 319(h) program and other sources, and comment on proposed actions and timetables. The extent of progress made in reducing salt and boron levels in the river would be entirely dependent on the number and effectiveness of voluntary actions that can be initiated, and the conviction of the group to accomplish anything. While the Regional Board will continue to encourage and support voluntary efforts to improve water quality in the LSJR, voluntary efforts alone do not provide any assurance for long-term compliance with water quality objectives.

Evaluation of Option 14: Promote voluntary efforts to comply with water quality objectives		
Factor	Justification	Score
Feasibility	Low – Grant funds are available to promote voluntary implementation of management practices to control salt and boron discharges, however, staff time for project oversight is limited. Dischargers voluntarily implementing management practices at their own expense would be at competitive disadvantage with dischargers choosing not to implement management practices.	1
Discharger Cost	Low – Administrative costs are low as no permit fees apply. Cost of compliance would also be low for dischargers as implementation of practices is voluntary and not required. Grant funds and low interest financing options are available to dischargers.	5
State Cost	Low– Grant funds for NPS implementation are already available. Additional resources may be needed for grant and project oversight. Voluntary implementation of management practices could occur with no state involvement.	5
Flexibility	Medium- Though this is the most flexible option for growers, there is no formal feedback mechanism incorporated to ensure that the voluntary actions being undertaken are effective and sufficient to bring LSJR into compliance with water quality objectives.	3

Evaluation of Option 14: Promote voluntary efforts to comply with water quality objectives (CONTINUED)		
Time needed to implement	Low – Could occur immediately.	5
Likelihood of Success	Medium- Though this option has a relatively high likelihood of success because state costs and discharger costs are low, there is no assurance that water quality objectives are provided.	19
Consistent with Laws and Policies	See Appendix 3	No

Option 15: Initiate a Management Agency Agreement (MAA) between the Regional Board, State Water Board, and the USBR.

The State Water Board, the Regional Board, and the USBR could enter into a Management Agency Agreement (MAA) whereby the USBR would be responsible for implementing management practices to control salt and boron discharges from the DMC or provide mitigation in the LSJR watershed. The USBR would, in effect, become the water quality management agency for USBR discharges from the DMC. The State Water Board and Regional Board could waive requirements for submittal of a report of waste discharge and issuance of WDRs provided that the conditions specified in the MAA were met. The prospect of using an MAA to control salt loading from the DMC would rely on the USBR's willingness to enter into such an agreement and conduct required mitigation.

Evaluation of Option 15: Initiate a Management Agency Agreement (MAA) between the Regional Board, State Water Board, and the USBR		
Factor	Justification	Score
Feasibility	Medium – The State Water Board has entered into Management Agency Agreements (MAAs) to facilitate cooperation and minimize duplicative efforts among agencies who actions have bearing on water quality in California. There are existing MAAs between the State Water Board and the Department of Forestry, Department of Pesticide Regulation, US Forest Service, and others. The State Water Board, the Regional Board, and the USBR could enter into an MAA that describes the steps that would be taken by each agency to address DMC salt imports to the LSJR; an MAA, however, is a cooperative agreement by nature and would provide little assurance that the USBR would meet load allocations since no regulatory requirements (e.g., WDRs) would be in place.	3
Discharger Cost	Low to Medium – Administrative costs are low as no permit fees apply. Cost of compliance with DMC load allocations, however, could be high. The State Water Board's Water Rights Decision 1641 already places responsibility on the USBR to take action to meet the existing salinity water quality objectives at Vernalis. Meeting DMC salt load allocations could place increased responsibility on the USBR (beyond that required by D-1641). Additional dilution flows or mitigation could be needed.	4
State Cost	Low– Staff resources would be needed to develop the MOU and for periodic oversight. Approximately, 0.5 PYs per year would be needed for development of the MAA and oversight of USBR mitigation.	5
Flexibility	High- Most flexible option for the USBR. MAA could be designed to incorporate adaptive management.	5

Evaluation of Option 15: Initiate a Management Agency Agreement (MAA) between the Regional Board, State Water Board, and the USBR (CONTINUED)		
Time needed to implement	Low – Could occur within one year if USBR is cooperative.	5
Likelihood of Success	Medium- This option has a relatively high likelihood of success because state costs and discharger costs are low. It is anticipated that this option would be more favorable (than WDRs) to the USBR. No assurances that water quality objectives will be met are provided.	22
Consistent with Laws and Policies	See Appendix 3	No

Summary of Implementation Option Evaluation

Continued regulation of NPDES discharges (Option 4) is the only implementation option that was evaluated to address point source discharges. Although the NPDES program has been effective for regulating point sources, the CWA specifically disallows the use of NPDES permits to regulate irrigation return flows. Option 4 scored high in the evaluation process and was determined to be consistent with applicable laws and policies. Continued use of NPDES permits will therefore be used to control salt and boron loads from municipal and industrial discharges to the LSJR. Waste load allocations contained in the TMDL and the salt and boron control program will be incorporated into NPDES permits. This control option is already in place and by default will be incorporated into the preferred alternative identified in Section 3.4.9. No new program of implementation components or associated Basin Plan changes are therefore needed to implement waste load allocations for point sources.

The remainder of the implementation options address nonpoint source discharges from agriculture, managed wetlands, and the DMC. These implementation options fall under the following five categories of controls: 1) prohibition of discharge; 2) individual WDRs; 3) general WDRs; 4) waiver of WDRs; and 5) voluntary controls. The evaluation of the implementation options is a subjective analysis used as a screening tool to identify the types of options that will be most effective. Its purpose was not to definitively select the single best option or to rule an option out entirely. The evaluation suggests that implementation options which target groups of dischargers (public water agencies) are more likely to be effective than implementation options that seek to regulate individuals. The evaluation also indicates that geographically focused implementation options will be more likely to succeed than implementation options that would be applied uniformly throughout the entire LSJR watershed. The following control options scored high and were determined to be consistent with applicable laws and policies (Table 4-5):

Option 2 - Geographically focused prohibition of discharge from all agricultural return flows and wetlands

Option 7-Geographically focused waste discharge requirements

Option 8-Adoption of waste discharge requirements for the USBR/CVP

Option 11-Adoption of geographically focused general waste discharge requirements

Option 12-Implementation of the existing waiver of waste discharge requirements for discharges from irrigated lands

Option 13-Implementation of a new waiver of waste discharge requirements for participants of a Regional Board approved real-time management program

Additionally, the following control options scored high but were determined to be inconsistent with certain laws or policies:

Option 10-Adoption of general waste discharge requirements for public water agencies

Option 14-Voluntary efforts to comply with water quality objectives

Option 15- Management Agency Agreement (MAA) between the Regional Board, State Water Board, and the USBR

These control options should not be ruled out since they could potentially be combined with other options to form an alternative that would be consistent with the applicable laws and policies. These options, however, should not be used as a stand-alone program of implementation.

Table 4-5. Scoring of Implementation Options

Factor	Implementation Option														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Feasibility	0	3	0	5	5	5	5	5	5	5	5	4	5	1	3
Discharger Cost	0	2	4	5	0	3	4	3	0	3	4	5	5	5	4
State Cost	3	3	1	4	0	3	5	5	2	4	5	5	4	5	5
Flexibility	0	3	4	4	0	2	4	3	0	3	4	4	5	3	5
Time Needed to Implement	4	4	1	5	0	3	5	3	2	5	5	5	5	5	5
Likelihood of Success	7	15	10	23	5	16	23	19	9	20	23	23	24	19	22
Consistent with Laws and Policies	N	Y	Y	Y	N	N	Y	Y	N	N	Y	Y	Y	N	N

4.4.6 Alternatives Considered

The objective of this section is to develop a series of alternatives that incorporates a combination of the most feasible and cost effective strategies to control salt and boron discharges. Four alternatives were considered to guide the development of the Regional Board's program of implementation for achieving salt and boron water quality objectives. The alternatives described below consist of either implementing a single control option or implementing a combination of control options. These alternatives have varying levels of regulatory intervention ranging from no action to prohibition of discharge.

Alternative 1: No Project/No Action

The no project alternative is to continue to address salt and boron discharges to the LSJR through the existing State Water Board and Regional Board Basin Plan policies. No change from the current level of regulatory oversight would occur.

Alternative 2: Geographically focused Prohibition of Discharge

Alternative 2 consist of developing a prohibition of discharge that would apply to agricultural and wetland discharges throughout the LSJR watershed. The prohibition would be designed to focus regulatory efforts on high priority subareas (subareas with the highest salt yields) by phasing the prohibition in over time. Initially, the prohibition would only apply to high priority subareas. Staff would have to identify individuals and/or entities in violation of the prohibition and take appropriate regulatory action to resolve any problems identified. The prohibition would be phased into lower priority subareas after high priority areas are addressed and as resources become available. No action to address DMC discharges (salt imports) would be taken.

Alternative 3: Focused General Waste Discharge Requirements for Public Water Agencies and Individual Waste Discharge Requirements for the DMC discharges

This alternative would involve establishing a single general WDR or multiple subarea specific general WDRs to regulate public water agencies. An individual WDRs would be used to implement DMC load allocations. Dischargers would be required to file a notice of intent (NOI) to comply with conditions of the general waste discharge requirement(s). Compliance with TMDL base load allocations would be a condition of the general waste discharge requirement(s). Dischargers would also be required to: 1) prepare and submit drainage management plans; 2) identify the implementation practices to be used to meet base load allocations in accordance with time schedules specified in the general waste discharge requirement(s); and 3) conduct routine water quality monitoring to guide implementation efforts and demonstrate compliance with TMDL base load allocations. Staff would review discharger submittals, determine discharger compliance with general WDRs and take appropriate regulatory action when needed. General WDRs would be focused on areas that pose the greatest threat to water quality by targeting the subareas that generate the greatest salt loads per acre of nonpoint source land use. General WDRs would be developed for high priority areas first and eventually phased in for lower priority areas if additional controls are needed to meet water quality objectives.

An individual WDR would be developed for the USBR to address DMC discharges to the LSJR. The individual WDR would include effluent limits equal to TMDL base salt load allocations for the DMC.

Alternative 4: Combination Waiver of Waste Discharge Requirements, Focused General Waste Discharge Requirements, and Management Agency Agreement (MAA) to address DMC discharges

This alternative involves using a combination of the existing waiver of WDRs for discharges from irrigated lands and a new waiver of WDRs developed for dischargers participating in a Regional Board approved real-time management program. The existing waiver of WDRs must be implemented in the LSJR watershed regardless of which alternative is selected. This alternative builds on the existing waiver of WDRs by adding a companion waiver specifically designed to address salt and boron discharges to the LSJR and to facilitate the use of real-time management to control salt and boron discharges.

This alternative would use a two-pronged approach whereby dischargers may participate in a real-time water quality management program and meet the conditions contained in both waivers or alternatively dischargers may choose not to participate in a real-time management program and be regulated under a general waste discharge requirement. Compliance with real-time TMDL load allocations would be a condition of the waiver option. Compliance with the fixed TMDL base load allocations would be a condition of the general WDRs. Similar to Alternative 3, these general WDRs would be focused on high priority salt sources and phased in over time. Dischargers certifying that their discharges would remain below a trigger value of 315 $\mu\text{S}/\text{cm}$ EC (Appendix 1, Section 4.2) would be unrestricted with regard to salt and boron and not subject to this control plan.

Dischargers choosing to participate in a real-time management program would be regulated by waiver of WDRs and benefit from increased load allocations (above base load allocations). Compliance with real-time load allocations or demonstrated compliance with water quality objectives in the LSJR at Vernalis would be a condition of the waiver program. For these reasons, it is expected that most dischargers would prefer regulation through waivers rather than regulation under a general permit.

Additionally, the Regional Board would attempt to establish an MAA between the State Water Board, the Regional Board, and the USBR to address salt imports from the DMC to the LSJR watershed. The MAA would include provisions requiring the USBR to comply with one or more of the following: 1) meet DMC load allocations; and/or 2) provide mitigation (e.g., drainage control and salt disposal, construction of an out of valley drain etc.); 3) provide dilution flows to create additional assimilative capacity for salt and boron in the LSJR. The MAA would also include a time schedule for implementation of these provisions. The net benefit of the USBR's corrective actions would need to be proportionate to their impacts. The MAA would allow for coordinated implementation of the State Water Board's Decision 1641 and the Regional Board's salt and boron control program. The Regional Board would pursue other avenues of compliance from the USBR if they were not willing to enter into the MAA or provide an appropriate level of mitigation. Such action could include a request for report of waste discharge for DMC discharges.

4.4.7 Evaluation of Alternatives

The alternatives were evaluated using the following criteria:

- 1) Technical feasibility of implementation
- 2) Likelihood of meeting water quality objectives
- 3) Discharger cost to implement
- 4) Time needed to implement

A combination of existing flow models, water quality models, and spreadsheet modeling tools were used to help evaluate each implementation alternative with respect to the above-mentioned criteria. The two primary goals of this modeling were to determine the effect of implementing each alternative on long-term water quality compliance and to estimate the drainage volumes and associated salt loads that would need to be retained by dischargers under each implementation alternative. The volume of retained drainage was used to calculate the cost to implement each alternative (Appendix 4). The water quality modeling component of this analysis provides a reasonable estimate of long-term water quality conditions, stated in terms of exceedances of the salinity water quality objective at Vernalis. An absolute prediction of water quality exceedance rates resulting from implementation of each alternative is not implied; rather, the model results are most appropriately used to compare the relative changes in long-term water quality exceedance rates resulting from implementing different drainage control scenarios. A brief overview of the modeling approach is described below and a detailed discussion is provided in Appendix 5.

The California Department of Water Resource's (DWR) DWRSIM model is a planning and operations model that is used to assess water availability to the State Water Project under various scenarios (UCD, 1999). DWRSIM study 771 superimposes the current level of hydrologic development (e.g., existing dams, diversions, and operational rules etc.) on historical unimpaired flows. The model therefore calculates historic flows as if the system was historically operated the same way it is operated under current conditions and with the existing infrastructure in place. DWRSIM model output from DWR Study 771 was used to generate monthly time series discharge data (WYs 1922 through 1994) for four key river and tributary inputs to the San Joaquin River watershed. Discharge data was compiled for the LSJR Upstream of Salt Slough, the Merced River upstream of the LSJR confluence, the Tuolumne River upstream of the LSJR confluence, and the Stanislaus River upstream of the LSJR confluence.

The discharged data generated from DWRSIM was used as input to the San Joaquin River Input Output Model (SJRIO), which is a mass balance water quality model that calculates mean monthly discharges and salt concentrations for a sixty-mile reach of the LSJR from Lander Avenue to Vernalis (SWRCB, 1987). SJRIO was modified to run with historical data, stochastic data, or a combination of both (Grober and Kratzer 1989, Rashmawi et al. 1989). Further refinements added abilities to perform multivariate time series analyses of major model components and to generate stochastic data for Monte Carlo simulations (Grober et al. 1992). For this analysis, SJRIO was run in Monte Carlo simulation mode, using the discharge data generated from DWRSIM as inputs for San Joaquin River watershed boundary conditions. The SJRIO model run provided monthly

discharge and TDS data output for the San Joaquin River at the Airport Way Bridge near Vernalis.

Vernalis flow and TDS data generated from SJRIO were imported into a post-processing spreadsheet model developed to ascertain the effect of imposing each implementation alternative on water quality in the LSJR near Vernalis. The spreadsheet model calculates changes in water quality exceedance rates resulting from changes in the amount of nonpoint source flows and loads generated from the following five source types:

- 1) Grassland subarea tile drainage
- 2) Grassland subarea tail drainage
- 3) Wetland drainage
- 4) Non-grassland tile drainage
- 5) Non-grassland tile drainage

Total monthly flow and mean monthly TDS data generated from SJRIO were recalculated in the spreadsheet model by subtracting the drainage flows and loads “held back” (retained) to comply with a given implementation alternative. The volume of drainage and salt load associated with the five types of discharges listed above were estimated so that each alternative could be evaluated. For example, implementing a prohibition of discharge (Alternative 2) requires holding back all NPS drainage that is generated (by the five source types listed above); while implementing the base load TMDL (Alternative 3) only requires holding back any drainage that is generated in excess of the TMDL base load allocations. The spreadsheet model also considers the constraint on discharge imposed by the SJR Selenium TMDL (McCarthy and Grober, 2001, CVRWQCB, 1996, CVRWQCB, 2001); all discharges of tile drainage from the Grassland bypass project were set at the 2010 (most stringent) load allocations specified in the Selenium TMDL. The annual drainage flows and loads that would need to be managed or treated to comply with each alternative were summarized. These included flows and loads that must be retained to comply with the selenium TMDL.

Evaluation of Alternative 1: No Project. The no project alternative is technically feasible because no additional implementation practices would be required. Additionally, the no project alternative would be in effect immediately and require no additional discharger expenditure. Significant effects associated with ongoing agricultural and wetland operations would, however, continue to occur. The no project alternative assumes that the provisions of the State Water Board’s Water Rights Decision 1641 will remain in affect. These provisions, in part, require that the USBR take action to meet the salinity water quality objectives at Vernalis. To date, this responsibility has been met through USBR water releases from New Melones Reservoir to dilute salt concentrations at Vernalis. Modeling results indicate that the Vernalis salinity water quality objectives will, however, continue to be exceeded even if these water quality releases are continued because during a series of dry years there is potentially insufficient water available for this purpose. DWRSIM study 771 imposes a 70-200 thousand acre-foot cap on the amount of water that the USBR will release to meet the Vernalis water quality objectives. This cap on water quality releases, however, is self imposed by the USBR’s New

Melones Interim Operation Agreement and does not relinquish the USBR from its obligation to meet salinity objectives at Vernalis pursuant to the State Water Board's Decision 1641. Modeling studies conducted to support the State Water Board's 1995 Bay Delta Plan indicate that even if no cap were imposed on New Melones releases, water quality exceedances would still occur because New Melones Reservoir would drop below its invert elevation during drier periods and a sufficient quantity of dilution water would not be available to achieve the Vernalis WQO (Wilcox, pers. Com. 2003). This underscores the need to implement salinity controls (in addition to dilution) to meet the Vernalis objectives.

Salinity water quality exceedances under the no project alternative will be most pronounced during the irrigation season and during dry and critically dry year types. If the USBR were to stop providing dilution flows, the exceedance rate would increase. Comparison of the expected exceedance rates with and without the New Melones dilution flows provides an overall sense of the affect that the current USBR mitigation is already having on Vernalis water quality.

Expected salinity water quality exceedance rates under Alternative 1 (with D-1641 water quality releases)		
Year Type	Irrigation season	Non- irrig. season
Critical	40%	34%
Dry	18%	14%
Below Normal	13%	15%
Above Normal	9%	7%
Wet	2%	1%

Expected salinity water quality exceedance rates under Alternative 1 (with out D-1641 water quality releases)		
Year Type	Irrigation season	Non- irrig. season
Critical	56%	41%
Dry	42%	24%
Below Normal	28%	21%
Above Normal	13%	9%
Wet	3%	1%

The no project alternative does not provide any assurances that water quality objectives will be met since historical water quality data indicates the LSJR frequently exceeds its water quality objectives during dry and critically dry year types. The no project alternative is in effect the status quo, which has not succeeded in meeting water quality objectives. Implementation of the current policies, at the current level of regulatory oversight is therefore unlikely to succeed in meeting water quality objectives in the future.

Evaluation of Alternative 2: Geographically Focused Prohibition of Discharge. The salt and boron technical TMDL report source analysis (Appendix 1) indicates that the Grassland and Northwest side subareas contribute the largest salt loads to the LSJR on both a total mass emissions and per unit area (of NPS land use area) basis. The Grassland and Northwest side subareas collectively contribute approximately 66 percent of the LSJR's total salt load. A focused prohibition of discharge would initially result in elimination of discharges from tile drains, surface drains, and wetlands from these high priority areas. If elimination of discharges from the Grassland and Northwest side subareas did not result in attainment of water quality objectives then the scope of the prohibition area would be expanded over time to encompass the entire LSJR watershed.

Therefore, for long-term planning purposes, the evaluation of Alternative 2 is based on the premise that a prohibition of discharge would eventually apply to the entire LSJR and that all NPS discharges (agricultural and wetland) to the LSJR would be eliminated.

Dischargers subject to the prohibition could comply using existing technology that ranges from plugging of surface and sub-surface drains to drainage water capture and re-use with ultimate disposal of saline drainage to evaporation ponds and/or landfills. These implementation practices are described in Appendix 2. While this implementation alternative is technically feasibility its effects on long-term agricultural and wetland viability have not been evaluated.

Alternative 2 provides a mechanism for making improvements in water quality objectives in the near term by eliminating the most significant saline discharges to the LSJR. Modeling results suggest that water quality exceedances would be significantly reduced compared to existing conditions (Alternative 1); however, a 19 percent exceedance rate is still anticipated during the irrigation season in critically dry years. Moreover, implementation of this alternative would likely result in a net build up of salts in the LSJR watershed since salts would continue to be imported in surface water supplies but no mechanism would be available to export salts out of the watershed. Increased soil and groundwater salinity would have a negative affect on both agricultural productivity and LSJR water quality since salt would eventually be discharged to the river through uncontrolled groundwater accretions.

Expected salinity water quality exceedance rates under Alternative 2 : Elimination of all drainage		
Year Type	Irrigation season	Non- irrig. season
Critical	19%	10%
Dry	7%	3%
Below Normal	2%	1%
Above Normal	0%	0%
Wet	0%	0%

Alternative 2 has the highest cost to implement because it involves retention and management of all NPS drainage that is generated in the LSJR watershed (Appendix 4). Implementation of Alternative 2 would cost approximately 90 to 126 million dollars per year. Treatment of a large volume of drainage contributes to the reletivley high cost.

Estimated volume of drainage needing treatment for implementation of Alternative 2.		
Source Type	Volume (TAF)	TDS (mg/)
Grassland tile drainage	32-42	3,400
Grassland tail drainage	60	630
Wetland drainage	130	1,000
Non-Grassland tile drainage	10	1,700
Non-Grassland tail drainage	270	390

Alternative 2 could be implemented in a relatively short time because the prohibition areas would initially be focused on the high salt generating areas in the LSJR watershed. Prohibition of discharge is likely the fastest alternative to implement because it does not require development of new permits or waiver requirements, as would be the case for implementation of Alternatives 3 and 4.

Evaluation of Alternative 3: Focused General Waste Discharge Requirements for Public Water Agencies and Individual Waste Discharge Requirement for the DMC discharges. Similar to Alternative 2, initial regulatory efforts would focus on high priority subareas. General WDRs would however eventually need to be developed for lower priority subareas (East side subareas) because it is unlikely that salt and boron water quality objectives will be achieved entirely through controls on West side discharges. Evaluation of Alternative 3 assumes a worst-case scenario whereby all discharges in the LSJR watershed would be regulated by seven subarea specific general WDRs. The general waste discharge requirement(s) would contain effluent limits set equal to the monthly TMDL base load allocations (Appendix 1). An individual WDR would be issued to the USBR to control discharges from the CVP by implementing monthly base load allocations for the DMC. This alternative constitutes full implementation of the TMDL base load allocations.

Implementation of Alternative 3 could be achieved using existing technology and is therefore technically feasible (Appendix 2). Alternative 3 would require construction of new facilities to convey, store, manage, and treat saline discharges. Expanded monitoring and drainage planning would also be needed.

Modeling results indicate that implementation of Alternative 3 would result in a marked improvement in water quality conditions at Vernalis. Similar to Alternative 2, significant water quality exceedances persist during the irrigation season in critically dry years (19%). These violations occur even though no load allocations are provided during times when no assimilative capacity is available. Implementation of Alternative 3 is expected to result in fewer exceedances of the water quality objectives during the non-irrigation season than Alternative 2 (prohibition). This is because Alternative 2 would require retention and treatment of all drainage, including some higher quality drainage that could be discharged to the river pursuant to Alternative 3. These allowable discharges of higher quality drainage actually act to improve water quality at Vernalis.

Expected salinity water quality exceedance rates under Alternative 3 : TMDL Base Load Allocation		
Year Type	Irrigation season	Non- irrig. season
Critical	19%	3%
Dry	7%	1%
Below Normal	2%	1%
Above Normal	0%	2%
Wet	0%	0%

The cost of implementing Alternative 3 is estimated to range from approximately 87 to 122 million dollars per year. These costs are slightly lower than costs for implementing Alternative 2, as the volume of drainage requiring treatment is reduced. The volumes of drainage needing treatment are shown as ranges because they vary depending on water year type. For example, the volume of Grassland tile drainage needing treatment ranges from approximately 13 thousand acre-feet during an above normal year type to approximately 23 thousand acre-feet during a dry year type. The

Estimated volume of drainage needing treatment for implementation of Alternative 3		
Source Type	Volume (TAF)	TDS (mg/)
Grassland tile drainage	13-23	3400
Grassland tail drainage	60-114	450-650
Wetland drainage	9-76	1000
Non-Grassland tile drainage	4-9	1600-1700
Non-Grassland tail drainage	121-204	390

volume of drainage needing treatment depends on two factors: 1) The amount of drainage generated; and 2) The amount of load allocation allowed for a given water year type. The volume of drainage needing treatment is therefore not necessarily highest during critical years or lowest during wet years.

Alternative 3 would initially require more time to implement than Alternative 2 because the Regional Board would need to request reports of waste discharge and place dischargers in the appropriate general waste discharge requirement. Dischargers would need additional time to develop and initiate monitoring to demonstrate compliance with TMDL load allocations. In the long run, however, full implementation of Alternative 3 would be faster than Alternative 2 because less drainage would ultimately need to be managed.

Evaluation of Alternative 4a: Combination Waiver of Waste Discharge Requirements, Focused General Waste Discharge Requirements, and Management Agency Agreement (MAA) to Address DMC Discharges. Alternative 4 is perhaps the most feasible alternative because it allows the largest amount of salt load to be discharged to the LSJR and therefore requires the smallest amount of drainage treatment.

The expected salinity water quality exceedance rates at Vernalis for Alternative 4 would be the same as for Alternative 3. In critically dry years, a 19 percent exceedance rate (approximate) would still occur during the irrigation season unless more fresh water dilution flows were provided or groundwater accretions were reduced. This exceedance rate is anticipated despite the fact that no load allocations are given when salinity WQOs are being exceeded. Alternative 4 would likely result in better long-term water quality conditions than Alternative 3 because more salts could potentially be exported from the basin under a real-time water quality management program thus facilitating a salt balance opposed to a salt build up. Except for Alternative 1 (no project/no action), Alternative 4 would allow for the most direct discharge to the LSJR.

One of the primary advantages of Alternative 4 is the reduced cost to dischargers resulting from reduced treatment needs. Similar to Alternative 3, the volume of drainage needing treatment varies by year type depending on how much drainage is generated and how much drainage can be discharged to the LSJR. Table 4-6 shows the estimated quantity of drainage that would need to be retained and treated if LSJR discharges were to operate under real-time TMDL load allocations without any re-operation of drainage. Dischargers would be responsible for forecasting the assimilative capacity in the San Joaquin River at Vernalis and for coordinating discharges to the LSJR so that water quality objectives would be met while at the same time maximizing discharges to the river. The drainage volumes presented in Table 4-6 would be captured and treated in a manner similar to Alternative 3. Based on these drainage volumes we

Estimated volume of drainage needing treatment for implementation of Alternative 4		
Source Type	Volume (TAF)	TDS (mg/)
Grassland tile drainage	8-18	3400
Grassland tail drainage	0-30	430-670
Wetland drainage	0-32	1000
Non-Grassland tile drainage	0-5	1500-1700
Non-Grassland tail drainage	0-34	380

estimate the cost to implement Alternative 4 to range from approximately 27 to 38 million dollars per year.

Table 4-6: Alternative 4a: Estimated Volume of Drainage Needing Treatment Using Real-Time TMDLs with No Re-operation

	Critical		Dry		Below Normal		Above Normal		Wet	
Discharge Category	Volume TAF	TDS mg/L	Volume TAF	TDS mg/L	Volume TAF	TDS mg/L	Volume TAF	TDS mg/L	Volume TAF	TDS mg/L
Grassland Subarea tile drainage	18	3,400	17	3,500	18	3,500	8	3,400	9	3,400
Grassland Subarea tail drainage	30	570	13	670	10	640	2	430	0	n/a
Wetland drainage	32	1,000	17	1,000	9	1,000	14	1,000	0	n/a
Non-Grassland tile drainage	5	1,700	3	1,700	3	1,700	1	1,500	0	n/a
Non-Grassland tail drainage	34	380	2	400	6	370	0	n/a	0	n/a
Total Volume	119		52		46		25		9	

TAF = thousand acre-feet

Alternative 4b: Real-time management with drainage re-operation. The volume of drainage needing permanent treatment under Alternative 4 could be significantly reduced if drainage was re-operated. Theoretically, salts would be temporarily retained when assimilative capacity is limited (low flow conditions). Retained salt would then be discharged back to the LSJR when additional assimilative capacity becomes available (higher flow conditions). It was assumed that any tile drainage captured from the Grassland subarea could not be discharged back to the LSJR because of elevated selenium concentrations. Eight to 18 thousand acre-feet of tile drainage would therefore always need to be retained and treated (Table 4-6), even with a comprehensive drainage re-operation system in place. All other drainage could eventually be discharged back to the LSJR (and not permanently treated). Additional conveyance and storage facilities would be needed to temporarily store and manage retained salts. The reduced cost associated with smaller volumes of drainage needing permanent treatment (capture, impoundment, treatment, and disposal to land) must be weighed against opportunity cost of building re-operation infrastructure.

The biggest cost associated with re-operation of drainage would most likely be for the construction of ponds to temporarily store drainage during times of limited assimilative capacity. The maximum volume of drainage needing temporary storage is estimated to be approximately 50 thousand acre-feet. Approximately 12,500 acres of temporary storage ponds would be required to impound this volume drainage, assuming an average pond depth of 4 feet. Conveyance systems would also be required to transfer stored drainage back to the river. The total cost for implementing real-time management with drainage re-operation is estimated to range from approximately 15 to 21 million dollars per year (Appendix 4).

Alternative 4 would require the most time to implement. Staff would need to develop a waiver of WDRs for dischargers participating in a Regional Board approved real-time management program. Guidelines would need to be developed that describes what an acceptable real-time management program must include. General WDRs would also need to be developed for each subarea for dischargers choosing not participate in a approved real-time management program. SJR dischargers would need time to develop drainage management plans, prepare feasibility studies, and install real-time monitoring equipment and telemetry. Temporary retention ponds would also be needed if drainage were to be re-operated. The Regional Board and other authorities may need to issue permits to allow discharges from retention ponds.

4.4.8 Recommended Program of Implementation

Each of the four alternatives that were evaluated could be implemented using existing technology and are therefore potentially feasible. Alternative 1 (no project/no action) is obviously the least expensive and the easiest to implement. Staff does not recommend Alternative 1, however, because it would not result in any improvement in water quality and therefore would not sufficiently implement the existing salt and boron water quality objectives. Implementation of Alternative 2 is expected to result in significant improvements in water quality at Vernalis, but the greatest improvements in water quality are anticipated to result from implementation of Alternative 3 or Alternative 4. Alternative 3 and Alternative 4 are expected to result in the same amount of water quality improvement. Alternative 3 is generally more stringent than Alternative 4 since Alternative 4 allows for NPS discharges of salt equal to the real-time assimilative capacity of the LSJR, while Alternative 3 only allows for discharges equal to TMDL base load allocations (which are conservatively based on low flow conditions). Neither Alternative 3 nor Alternative 4, however, would allow for NPS discharges that contribute to increased water quality exceedences. A comparison of the expected salinity WQO exceedence rates associated with implementation of each alternative is shown in Figure 4-1.

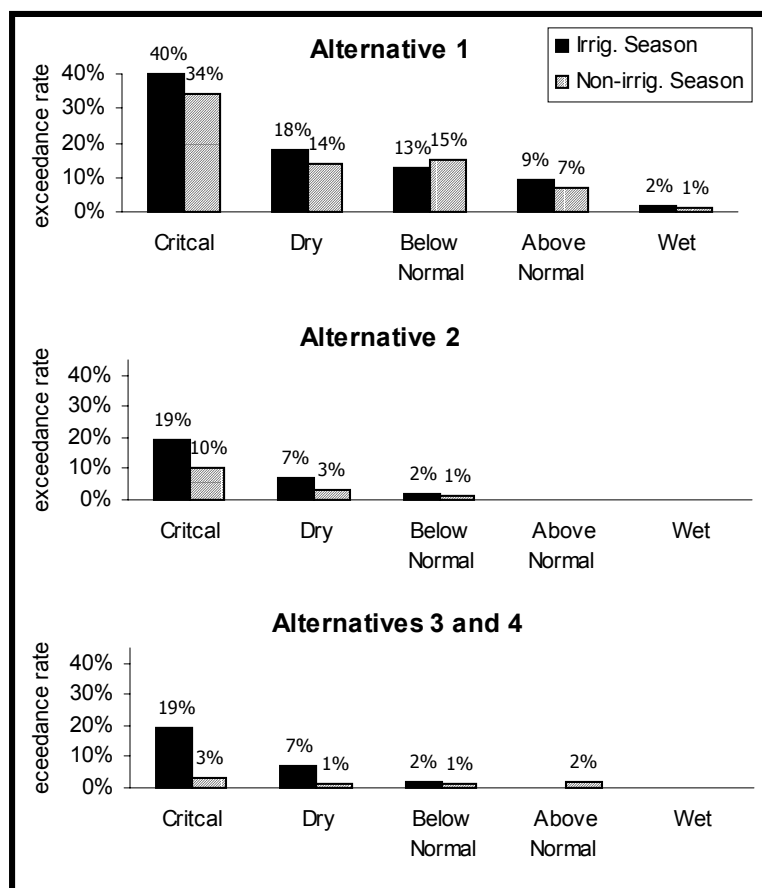
Based on the anticipated degree of water quality improvement, and in consideration of the cost of implementation, the staff recommended alternative is Alternative 4.

Table 4-7: Estimates of Annual Cost to Dischargers Associated Implementation Alternatives 1-4

Alt. #	Description	Cost of Implementation (\$ Million/Year)
1	No Action	0
2	Prohibition of Discharge	90-126
3	Base Load TMDL	87-122
4a	Real-time TMDL (no re-operation)	27-38
4b	Real-time TMDL with re-operation	15-21

Alternative 4 will achieve the same degree of water quality improvement as Alternative 3 at less than one third of the cost to dischargers. Alternative 4 is comprised of two variants: 4a) Real-time TMDL without re-operation; and 4b) Real-time TMDL with re-operation of drainage. Implementation of Alternative 4b will be less costly than implementation of Alternative 4a because less drainage water would need to be permanently stored and treated. Implementation of Alternatives 4a and 4b have some common institutional and infrastructure requirements. Both alternatives require increased monitoring, modeling, forecasting and coordination. Alternative 4b builds on Alternative 4a by adding a drainage re-operation component. Moving from Alternative 4a to Alternative 4b will require additional infrastructure (temporary retention ponds) and more sophisticated drainage management operations. Some dischargers may initially implement real-time water quality management without re-operation of drainage and then over time phase in drainage re-operation to save money in the long-term. The decision to implement drainage re-operation should be left up to the dischargers to provide maximum flexibility.

Figure 4-1. Expected Rate of Exceedance of the Vernalis Salinity Water Quality Objective Associated with Implementation of Alternatives 1-4



4.5 Time Schedules

Porter-Cologne requires the Regional Board to include a time schedule for actions to be taken as part of the program of implementation. The recommended action to be taken by the Regional Board will be to adopt a control program for salt and boron discharges into the LSJR that is based on Alternative 4. Alternative 4 relies on a combination of mechanisms to control discharges, including the use of:

- 1) The existing waiver of WDRs for discharges from irrigated lands
- 2) A new waiver of WDRs for dischargers wishing to participate in a Regional Board approved real-time salinity management program
- 3) New subarea-specific general WDRs for dischargers choosing not to participate in a Regional Board approved real-time salinity management program

Adoption of new subarea-specific general WDRs will not require changes to the Basin Plan. Regional Board staff will recommend adoption of the new waiver of WDRs (real-time waiver) subsequent to the adoption of the proposed Basin Plan amendment. The subarea specific general WDRs and real-time waiver will include detailed time schedules for the actions to be taken. Therefore, the Basin Plan amendment does not need to include such a schedule.

4.5.1 Time Schedule for Compliance with Water Quality Objectives

Salt and boron impairment in the LSJR has occurred over a long period of time and has resulted from complex land and water use patterns. The relationship between implementation of drainage management practices, surface and groundwater interactions, and long-term water quality conditions in the LSJR watershed is not well understood. Moreover, many of the variables that affect salt concentrations in the LSJR (e.g., flow, consumptive water use) are beyond the purview of the Regional Board. The salt and boron problem will therefore take a significant amount of time to resolve and it is not possible, with any degree of certainty, to predict if or when water quality objectives can be met. The Regional Board can, however, establish a reasonable time frame for compliance with the proposed program of implementation (which entails compliance with real-time load allocations or fixed base load allocations).

Priority for the implementation of load allocations to control salt and boron discharges will be based on the unit area loading from each subarea. Unit area loading is equal to total load generated from each subarea divided by the acreage of nonpoint source land use in that subarea. The most significant sources of salt and boron are considered to be the subareas with the greatest unit area loading to the San Joaquin River (Table 4-8). Subareas contributing smaller unit area salt loads are considered a lower priority and will be subject to more “distant” time schedules. This will allow the Regional Board to focus its efforts in the most important geographic areas and it will provide dischargers in lower priority subareas with additional time to resolve salt and boron problems without regulatory oversight. This approach is consistent with the Regional Board’s Watershed

Policy, which calls for “focusing efforts on the most important problems and those sources contributing most significantly to those problems.”

Table 4-8: Subarea Priorities for Compliance with the Control Program for Salt and Boron in the LSJR

Subarea	Unit Area Load ¹ (tons/acre/year)	Priority
San Joaquin River Upstream of Salt Slough	0.12	Low
Grassland	0.90	High
Northwest Side	2.61	High
East Valley Floor	0.24	Low
Merced River	0.14	Low
Tuolumne River	0.51	Medium
Stanislaus River	0.27	Low

¹ Source: Appendix 1: Salt and boron technical TMDL staff report

Historical water quality data indicates that salt and boron water quality exceedences are most pronounced during drier year types. This is particularly evident during critically dry years. Salinity WQOs will be exceeded approximately 19 percent of the time in critical year types during the irrigation season even with the proposed control program in affect (Section 4.4.7). Furthermore, the estimated volume of drainage requiring treatment during a critically dry year is twice that of a dry year type (Table 4-6). This means that implementation costs will be at their peak during critically dry years. Accordingly, additional time has been provided to all subareas to comply with the load allocations that apply during critically dry years. The proposed schedule for compliance with load allocations or base load allocations is shown in Table 4-9.

Table 4-9: Schedule for Compliance with Salt and Boron Load Allocations

Subarea Priority	Years to implement ¹	
	Wet through Dry Year Types	Critical Year
High	8	12
Medium	12	16
Low	16	20

¹ number of years from the date of adoption of this control program

4.6 Surveillance and Monitoring

California Water Code Section 13242 requires that a program of implementation for achieving water quality objectives include a description of the surveillance to be undertaken to determine compliance with objectives. This information is contained in Chapter V of the Regional Board’s Basin Plan (Surveillance and Monitoring). The Regional Board’s existing Surveillance and Monitoring program for the Sacramento and San Joaquin River Basins is comprised of the following seven general elements.

1) *Data Collected by Other Agencies*

The Regional Water Board relies on data collected by a variety of other agencies. For example, the DWR has an ongoing monitoring program in the Delta and the USGS and DWR conduct monitoring in some upstream rivers. The California Department of Fish and Game, US Fish and Wildlife Service, USGS, and California Department of Health Services also conduct special studies and collect data.

2) *Regional Water Board and State Water Board Monitoring Programs*

The State Water Board manages its own Toxic Substances Monitoring (TSM) program to collect and analyze fish tissue for the presence of bioaccumulative chemicals. The Regional Water Board participates in the selection of sampling sites for its basins and annually is provided with a report of the testing results.

3) *Special Studies*

Intensive water quality studies provide detailed data to locate and evaluate violations of receiving water standards and to make waste load allocations. They usually involve localized, frequent and/or continuous sampling. These studies are specially designed to evaluate problems in potential water quality limited segments, areas of special biological significance or hydrologic units requiring sampling in addition to the routine collection efforts.

4) *Aerial Surveillance*

Low-altitude flights are conducted primarily to observe variations in field conditions, gather photographic records of discharges, and document variations in water quality.

5) *Self-Monitoring*

Self-monitoring reports are normally submitted by the discharger on a monthly or quarterly basis as required by the permit conditions. They are routinely reviewed by Regional Water Board staff.

6) *Compliance Monitoring*

Compliance monitoring determines permit compliance, validates self-monitoring reports, and provides support for enforcement actions. Discharger compliance monitoring and enforcement actions are the responsibility of the Regional Water Board staff.

7) *Complaint Investigation*

Complaints from the public or governmental agencies regarding the discharge of pollutants or creation of nuisance conditions are investigated and pertinent information collected.

No changes to the surveillance and monitoring chapter of the Basin Plan (Chapter V) are needed for the proposed amendment. Instead, self-monitoring requirements will be

specified in waiver conditions or WDRs (for dischargers not participating in a waiver based program), and NPDES permits for point source discharges.

4.6.1 Proposed Surveillance and Monitoring Activities

Monitoring will be needed to determine if the proposed Basin Plan amendment, once adopted, is successful in implementing the existing salt and boron water quality objectives in the San Joaquin River at the Airport Way Bridge near Vernalis. The responsibility for conducting self-monitoring ultimately rests with the dischargers who are regulated under the control program. It is the Regional Boards responsibility to conduct compliance monitoring and monitoring for special studies. The Regional Board and other agencies (e.g., USGS, DWR) conduct routine flow and EC monitoring that can be used to augment discharger-monitoring efforts. If ongoing agency led monitoring programs are discontinued it will be the dischargers responsibility to continue any necessary monitoring. The goals of the monitoring program will include:

- Goal 1: Determining compliance with established water quality objectives for salt and boron
- Goal 3: Determining compliance with established waste load allocations and load allocations for salt and boron
- Goal 3: Determining the effectiveness of management practices in controlling salt and boron discharges to the LSJR
- Goal 4: Facilitating real-time water quality management

Of the four goals, the highest priority is to determine compliance with water quality objectives (Goal 1). Monitoring will be needed to determine if water quality objectives are being met. This Monitoring will be conducted by outside agencies and compiled and analyzed by the Regional Board. Since this control program is designed to meet the salinity and boron water quality objectives in the San Joaquin River at the Airport Way Bridge near Vernalis, at least one sampling site is needed at this location. The USGS collects continuous flow and EC data at the San Joaquin River at the Airport Way Bridge near Vernalis and the Regional Board collects TDS and boron grab samples on a monthly basis. These combined monitoring programs will achieve Goal 1.

If water quality objectives are not being met, then it is important to determine which areas are not meeting their allocations (Goal 2). Flow, EC, TDS, and boron monitoring will be needed to characterize salt and boron loads generated from each subarea because load allocations have been set at the subarea level. In most cases, subarea loads can be determined by establishing one or two key monitoring stations located upstream of the subarea confluence(s) with the main stem of the LSJR. Flow monitoring stations should be paired with water quality monitoring whenever practical. Flow and EC monitoring should be conducted on a continuous basis. Sampling for boron and TDS should be conducted at a weekly or monthly frequency depending on site-specific variability. The suggested sites to accomplish Goal #2 are listed in Table 4-10. More sites may be necessary to

characterize the East Valley Floor and Northwest side subareas because these areas are adjacent to the LSJR and drain diffusely to the river from many locations.

Table 4-10 Suggested Monitoring Sites for Determining Compliance with Subarea Load Allocations (Monitoring Goal #2)

Subarea	Monitoring Sites	Status/Agency		
		Flow	EC	TDS/Boron
Stanislaus River	Stanislaus River near Ripon	C/USGS	C/USGS	
Tuolumne River	Tuolumne River at Modesto	C/USGS	C/USGS	
Merced River	Merced River near Stevinson	C/DWR	C/DWR	
Northwest	Ingram Creek	N	N	
	Hospital Creek	N	N	
	Del Puerto Creek	N	N	
	Orestimba Creek	C/USGS	C/USGS	
	Spanish Creek	N	N	
	SJR at Crows Landing	C/USGS	C/USGS	
East Valley Floor	Harding Drain/TID Later #5	N	N	
	TID Laterals #2,#3,	N	N	
	MID Lateral #4	N	N	
Grassland	Salt Slough at Hwy 165 near Stevinson	C/USGS	C/USGS	
	Mud Slough (north) near Gustine	C/USGS	C/USGS	
	Los Banos Creek	N	N	
Upstream of Salt Slough	San Joaquin at Lander Ave	C/DWR	C/DWR	
C = continuous, M = monthly, W = weekly, P =periodic/unspecified, N = no monitoring or unknown status				

If allocations are not being met, it is important to know whether the necessary management practices are being implemented to control salt and boron discharges and if those practices are effective (Goal 3). To meet Goal #3 (determine degree of implementation of management practices), information must be collected from growers on the types of practices being used and how those practices are being applied. The following factors should be considered in collecting this information: 1) minimize the paperwork burden on growers; 2) use existing reporting systems; and 3) create a repository for the data that will allow for ease of data entry and analysis.

To assess the effectiveness of specific management practices or strategies, field level evaluations will need to be conducted. In most cases, salt and boron management practices simply involve preventing drainage from entering the LSJR, so verification that these practices are actually being implemented is generally more important than assessing their effectiveness. Field evaluations should be conducted to quantify the amount of load reduction or reduction in off-site migration of salt and boron that could be expected with implementation of a new management practice or strategy. Field evaluations will also be necessary to demonstrate that a discharger or group of dischargers are meeting the conditions specified in applicable waivers or general permits.

4.6.2 Future studies

In 1997 the Basin Plan was amended to include a prohibition of agricultural subsurface drainage from the Grassland Watershed. The supporting staff report for that amendment recommended a number future studies to facilitate refinement of water quality objectives and implementation of effective drainage controls (RWQCB 1996). Most of the recommend studies have not yet been carried out, but there is still a need for this information. The recommended studies and ongoing data needs that are relevant to the control of salt and boron are summarized below (CVRQCB, 1996).

- 1) Development of a regional groundwater model. The TMDL source analysis estimates that salt loading to the LSJR from groundwater accretions account for approximately 30 percent of the LSJR's total salt load (as measured at the Airport Way bridge near Vernalis). This is a coarse estimate, however, and available loading capacity and load allocations are dependent on groundwater loading. It is therefore important to refine groundwater-loading estimates to ensure that load allocations are appropriate. Moreover, ground and surface water interactions as well as the impacts of certain management practices are not well understood. Funding for a watershed groundwater model should be a high priority.
- 2) An assessment of the efficacy and the cost and benefits of actions taken by dischargers to meet water quality objectives.
- 3) Development of drainage reduction technology and transfer to the farm level. The biggest unknown in utilizing water management to implement load reductions is the effectiveness of the available technology. Efforts should be focused on determining which technologies (or parts of technologies) have the greatest potential for successful implementation within the drainage problem area. These are most effectively answered using a multi-disciplined effort to develop information about drainage reduction technology and transfer this to the farm level. Several existing mechanisms are available for development of the technology (United States Department of Agriculture (USDA), Agricultural Research Service (ARS), University of California (UC) System Cooperative Extension and private efforts) and its transfer (UC Cooperative Extension, USDA, NRCS, local water agencies and private efforts). The role of the Regional Board should be to encourage and support these efforts.
- 4) Regional watershed storage of salt and other watershed drainage solutions needs to be studied to determine their risk as compared with the risk or cost associated with continued use of the San Joaquin River as an outlet. The Regional Board should provide support to agencies attempting to find grant funds for these studies and, as available, allocate resources to determine whether these solutions are applicable in the watershed and whether interim sites should be tested.
- 5) Studies on the use of a valley wide drain to carry salts generated by agricultural irrigation out of the valley should be continued as the only feasible, long-range

solution for achieving a salt balance in the Grassland watershed and in the Central Valley.

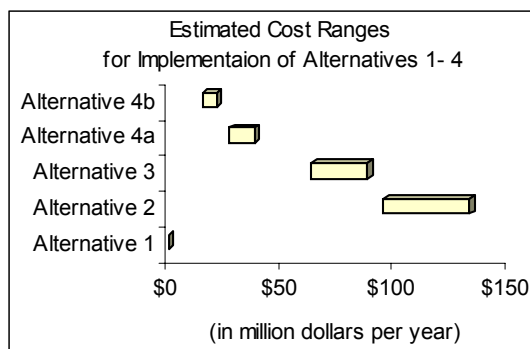
- 6) Study the effect that well water and the reuse of tile drain water have on decreased soil quality, i.e., increased salt and boron concentration, reduced yield, and increased use of Delta water for leaching and subsequent increased drain water volume and loads.
- 7) Load monitoring studies to establish effectiveness of control measures for toxic trace elements, salinity and boron. These studies should focus on establishing cause-and-effect relationships.

These studies have been presented here to recognize limitations in the current database. The studies are not proposed for incorporation into the Basin Plan.

5 Economic Analysis

Following is a summary of the economic analysis described in Appendix 4.

Implementation of a control program for salt and boron discharges to the LSJR will require significant expenditures from farmers and wetland operators. Estimates of the implementation costs to dischargers range from 15 to 133 million dollars per year depending on which alternative is selected.



Alternative 4, the recommended alternative, is the least expensive alternative to implement because drainage management needs are minimized and allowable discharges to the LSJR are maximized through real-time water quality management. Implementation of Alternative 4 will cost approximately 27 to 38 million dollars per year. Spreading this cost out over the 1.1 million acres of non point source land use in the LSJR watershed results in cost of \$25 to 35 per acre per year. The economic analysis indicates that cost to dischargers can be further reduced if dischargers implement re-operation of drainage along with real-time management. Implementation of drainage re-operation should bring the total cost of implementation down to the 15 to 21 million dollar a year range or \$14 to 19 per acre per year.

The current cost of agricultural production in the LSJR watershed is approximately 1.8 to 2.5 billion dollars per year. These costs include the cost for equipment, irrigation, water, planting, land preparation, application of fertilizers, pest management, harvesting costs, and others. The cost to implement Alternative 4a (real-time management without re-operation) would amount to an estimated 2 percent increase in the current cost of agricultural production in the entire LSJR watershed. While this cost increase may seem relatively modest, it is important to note that this is just the cost to implement one control

program. Farmers may be faced with additional costs in the near future to implement other control programs for the control of pesticides, oxygen demanding substances, and other pollutants. Costs to implement controls for other pollutants may be additive or there may be overlap in the control programs. For example, the control of pesticide runoff in the irrigation season may in large part already be achieved through control of drainage runoff in this salinity control program. The additive or overlapping costs of the various control programs will be considered as each new program is proposed and evaluated.

Furthermore, information provided in U.C. Cooperative Extension Costs and Returns Studies indicate that some of the major crops grown in the San Joaquin Valley are not profitable because costs often exceed revenues. Adding additional costs to marginally profitable or unprofitable agricultural operations will be detrimental to agricultural interests in the LSJR watershed. We have, however, attempted to develop and recommend a program of implementation that will result in attainment of water quality objectives and minimize costs by providing dischargers with maximum flexibility and opportunity to discharge.

6 California Environmental Quality Act (CEQA) Review

The secretary of resources has certified the Basin Planning process as meeting the requirements of section 21080.5 of the California Environmental Quality Act (CEQA). As such, documents prepared in connection with the basin plan amendment may be substituted in lieu of an environmental impact report. These documents must include either alternatives to the activity and mitigation measures to reduce any significant or potentially significant effect that the project may have on the environment or a statement that the project would not have a significant impact on the environment. This statement must be supported by a checklist or other documentation which shows the possible effects that were considered when reaching the decision.

The following checklist was prepared in compliance with CEQA requirements and to assist in identifying potential impacts and outlining mitigation measures. The checklist is followed by discussion of each of the 17 categories of impact.

The proposed Basin Plan Amendment does not prescribe particular changes in land use planning. Dischargers of agricultural or wetland drainage water may, however, chose to alter land use practices to comply with the regulations by installing drainage recycling facilities or retiring land. Reuse of agricultural drainage may also result in degradation of soil quality and reduced agricultural productivity. The recommended alternative minimizes the quantity of drainage water that would need to be treated by farmers. Potential indirect impacts to agricultural lands have therefore been minimized. Additionally, an extended compliance schedule is provided for in the recommended alternative which, it is believed, would allow sufficient time to develop management schemes that would minimize these impacts. It is, however, not possible to predict the extent of the possible impacts or the mitigation for impacts since management technologies have not yet been fully developed and since it is at the discretion of the agricultural and wetland dischargers to select the means by which they comply with the proposed regulations.

6.1 Environmental Checklist Form

1. Project title

Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Discharges of Salt and Boron in the San Joaquin River Basin.

2. Lead agency name and address

California Regional Water Quality Control Board, Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827-3098

3. Contact person and phone number

Eric Oppenheimer, Environmental Scientist (916)255-3234

4. Project location

San Joaquin River Watershed: the San Joaquin River from Friant Dam to the Airport Way Bridge near Vernalis

5. Project sponsor's name and address

California Regional Water Quality Control Board, Central Valley Region
3443 Routier Road, Suite
Sacramento, CA 95827-3098

6. General plan designation

Not applicable

7. Zoning

Not applicable

8. Description of project

The Regional Board is proposing to amend the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins. The purposes of the proposed amendment are 1) to add methods to calculate salt and boron load limits for land areas that discharge to the San Joaquin River from Mendota Dam to the Airport Way Bridge near Vernalis and 2) to adopt an implementation strategy to achieve these load limits.

9. Surrounding land uses and setting

The areas impacted by this basin plan amendment include the San Joaquin River watershed downstream of Friant Dam and upstream of the Airport Way Bridge near Vernalis. The watershed boundary, clockwise from the Airport Way Bridge, follows the Stanislaus River to Caswell Park. From Caswell Park, the boundary follows a ridgeline north to the fork of the Main District Canal east of Ripon and on to the South San Joaquin Main Canal to the intersection with Woodward Reservoir. The boundary continues along the drainage divide between Woodward Reservoir and Littlejohns Creek, and then along the South San Joaquin Main Canal, and the North Main Canal. Just past the intersection

of North Main Canal and Littlejohns Creek, the boundary follows the divide between the San Joaquin Main Canal and Littlejohns Creek to the Stanislaus County line. The east boundary of the watershed follows the eastern edge of the Stanislaus and Merced County lines. Where the Merced County line meets the Madera County line, the boundary follows the Calwater boundary to the San Joaquin River at Friant Dam. The southern boundary of the watershed follows the San Joaquin River from Friant Dam to the Mendota Pool. Here the boundary follows the southern edge of Calwater RBUASPW areas 654120000 (Los Banos Hydrologic Area), 654241052, 654241053, and 654241054, west to the Fresno/San Benito County line. From here, the western boundary of the watershed follows the crest of the Coast Range along the Fresno, Merced, and Stanislaus county lines. The northern boundary continues along the north side of Hospital and Lone Tree Creeks and continues along the northern edge of Calwater 656410000 (Patterson Hydrologic Area), and then follows the gas line running northeast across the Vernalis Gas Fields coincident with the angle of Airport Road, to the San Joaquin River at the Airport Way Bridge.

The land uses in the area include agriculture, wetlands, and urban.

10. Other public agencies whose approval is required

State Water Resources Control Board

Office of Administrative Law

U.S. Environmental Protection Agency

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- | | |
|--|---|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Biological Resources |
| <input type="checkbox"/> Hazards & Hazardous Materials | <input type="checkbox"/> Mineral Resources |
| <input type="checkbox"/> Public Services | <input type="checkbox"/> Utilities/Service Systems |
| <input type="checkbox"/> Agriculture Resources | <input type="checkbox"/> Cultural Resources |
| <input type="checkbox"/> Hydrology/Water Quality | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Recreation | <input type="checkbox"/> Mandatory Findings of Significance |
| <input type="checkbox"/> Air Quality | <input type="checkbox"/> Geology/Soils |
| <input type="checkbox"/> Land Use Planning | <input type="checkbox"/> Transportation/Traffic |

DETERMINATION:

On the basis of this initial evaluation:

- ☒ I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☐ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the Proposed Project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the Proposed Project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Proposed Project, nothing further is required.

Signature

Date

Dennis Westcot, Environmental Program Mgr.
Printed Name

Cal. Regional Water Quality Control Board
Central Valley Region

EVALUATION OF ENVIRONMENTAL IMPACTS

This Environmental Checklist has been prepared in compliance with the requirements of CEQA relating to certified regulatory programs.

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
I. AESTHETICS Would the Project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control the District may be relied upon to make the following determinations. Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IV. BIOLOGICAL RESOURCES – Would the Project:				
a) Have a substantial adverse effect, either directly, or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulators, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
V. CULTURAL RESOURCES – Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource of site or unique geological feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
VI. GEOLOGY AND SOILS – Would the Project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Seismic-related ground failure,, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VII. HAZARDS AND HAZARDOUS MATERIALS – Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
f) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VIII. HYDROLOGY AND WATER QUALITY – Would the Project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which results in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create or contribute runoff water which exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
including flooding as a result of the failure of a levee or dam?				
j) Inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
IX. LAND USE AND PLANNING – Would the Project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
X. MINERAL RESOURCES – Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XI. NOISE – Would the Project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a Project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XII. POPULATION AND HOUSING – Would the Project?				
a) Induce substantial population growth in an	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XIII. PUBLIC SERVICES				
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XIV. RECREATION				
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XV. TRANSPORTATION/TRAFFIC – Would the Project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio to roads, or congestion at intersections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion/management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a change in air traffic patterns,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
including either an increase in traffic levels or a change in location that results in substantial safety risks?				
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Result in inadequate parking capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

XVI. UTILITIES AND SERVICE SYSTEMS – Would the Project?

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the Project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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IMPACT	POTENTIALLY SIGNIFICANT IMPACT	POTENTIALLY SIGNIFICANT UNLESS MITIGATION INCORPORATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
b) Does the Project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

THRESHOLDS OF SIGNIFICANCE

For the purposes of making impact determinations, potential impacts were determined to be significant if the proposed project, or its alternatives would result in changes in environmental condition that would, either directly or indirectly, cause a substantial loss of habitat or substantial degradation of water quality or other resources.

6.2 Discussion of Environmental Impacts

Analysis of potential environmental impacts is based on possible changes to water and drainage management practices to comply with the proposed regulations. Potential practices are described in Section 4.4.2 and Appendix 2. Expanded discussion is included only for checklist questions answered Potentially Significant Impact, Less than Significant with Mitigation Incorporation, or Less than Significant Impact.

I. Aesthetics

Possible changes to water and drainage management practices by agricultural and wetland dischargers to comply with the proposed regulations would not alter any scenic vistas, damage scenic resources, degrade the visual character of any site, or adversely affect day or nighttime views.

II. Agricultural Resources

The project would not convert farmland to non-agricultural uses as no changes to land use designations are being sought. Agricultural dischargers may use a variety of water and drainage management practices, discussed in Section 4.4.2 and Appendix 2, or other potential strategies to comply with the proposed Basin Plan Amendment. Such practices are unlikely to lead to conversion of farmland to non-agricultural uses, though some agricultural dischargers may choose to use agricultural lands to reuse, store, or treat recycled drainage water. Any facilities constructed to comply with the provisions of the proposed Basin Plan Amendment are considered as appurtenant to agricultural operations and therefore an agricultural use. Furthermore, agricultural dischargers have a wide range of options available to comply with the proposed Basin Plan Amendment. Management practices employed to comply with the proposed Basin Plan

Amendment may occur at the farm scale, district scale, or basin-wide scale. Specific projects implemented to comply with the proposed regulation would need to be evaluated by the implementing entity, as necessary.

Costs to dischargers have been minimized through selection of the most cost effective implementation alternative in section 4.4.8. The recommended alternative requires the least amount of drainage treatment (except for the no action alternatives-which has been determined to be inconsistent with the goals of the project), this should minimize the burden to farmers and any potential effects on agriculture. The compliance time schedule ranges from 8-16 years for dry through wet year types and is extended to 12-20 years for critically dry year types. This allows time for farmers to develop cost effective implementation strategies that have the lowest possible impact on agricultural productivity and the least agricultural costs. Further, availability of federal and state government funds for environmental conservation (e.g., EQIP and Proposition 13 funds) should allow growers to offset some of their costs, if they choose an approach that requires a greater capital investment.

III. Air Quality

Possible changes to water and drainage management practices would not have any affect on air quality.

IV. Biological Resources

Compliance with Load allocations would likely result in a reduction in wetland and agricultural drainage return flows to the LSJR. The most pronounced reduction in drainage return is expected during low flow conditions when the assimilative capacity of the LSJR is lowest. Agricultural return flows make up a large fraction of the total flow in Mud Slough, Salt Slough and the LSJR's upstream of the Merced River during low flow conditions. A reduction in return flows would exacerbate the impacts of low flow conditions in certain agricultural ditches, sloughs, and reaches of the LSJR. Decreased flow during low flow conditions may result in a number of adverse impacts including a reduction in the wetted perimeter of affected reaches. These impacts could reduce the quantity of habitat for aquatic and riparian-dependent organisms, which include a number of potentially affected state and federally listed special status species (e.g., Giant Garter Snake, California Red Legged Frog, Western Yellow-Billed Cuckoo, Bald Eagle, Swainson's Hawk) (USBR, 2002). This impact would be reduced downstream of the Merced, Tuolumne, and Stanislaus River confluences with the LSJR as agricultural drainage becomes an increasingly smaller percent of LSJR flow.

Portions of the TMDL project area are located within the known range of the Fall/Late Fall-run Chinook Salmon; however, adverse impacts to this federal candidate species (also a state Species of Concern) are not expected as a result of the proposed project. According to National Marine Fisheries Service Chinook Listing Status Maps (1999) the drainage areas of Mud Slough, Salt Slough and the

LSJR upstream of the Merced River are not located within the current known range of the species. In fact, the California Department of Fish and Game actually installs barriers on the LSJR near the mouth of the Merced River to route Fall-run Chinook Salmon up the Merced River during the spawning season (USBR, 2000).

Potentially significant impacts resulting from reduced return flows have been identified above. There are a number of factors unrelated to this project, however, that have a greater influence on return flows to the LSJR.

Agricultural return flows are largely a function of the acreage of the area drained and volume of applied water. During droughts less water is applied to a smaller area and as a result the volume of drainage generated and eventually returned to the LSJR is reduced. Periods of drought correspond to the lowest flow conditions in Mud Slough, Salt Slough, and the LSJR. In the case of droughts or drier water years, return flows to the LSJR would be substantially reduced even in the absence of the proposed project.

There are a number of planned and ongoing projects or activities that will also act to reduce the volume of drainage to the LSJR. For example, an existing TMDL for selenium in the LSJR is being implemented through a waste discharge requirement on the Grassland Bypass Project. The waste discharge requirements impose load allocations for selenium discharges from the San Luis Drain, which is major source of flow to Mud Slough during the irrigations season. Implementation of selenium load allocations already results in decreased flow in Mud Slough. It is important to note, however, that selenium is a trace mineral (commonly found in subsurface drainage from the west side of LSJR watershed) that can be toxic to fish and wildlife.

The USBR's San Luis Drainage Feature Reevaluation Project (USBR, 2001, USBR, 2002) is another ongoing program that will potentially affect the quantity and quality of agricultural drainage returns to the LSJR. The USBR has a legal obligation to provide drainage to an 81,000-acre drainage-impacted area within the Grassland Subarea known as the Grassland Drainage Area (GDA). Tile drainage from the Grassland Sub-area is the principal source of flow in the San Luis Drain. The USBR is currently evaluating 3 options for providing drainage to the GDA. All three options involve capture and redirection of the agricultural drainage originating from the GDA. The San Luis Drainage Feature Reevaluation Project will therefore result in a reduction of flow to Mud Slough and the LSJR even if the proposed control program is not implemented.

The proposed project, the selenium TMDL, and the San Luis Feature Reevaluation Project are all expected to result in a reduction of irrigation return flows to the LSJR. As discussed above, there are potential adverse impacts associated with reduced flows. These potential adverse impacts are however offset by the environmental benefit of removing agricultural drainage from river. Agricultural drainage is one of the largest pollution sources in the LSJR

watershed. Both this proposed project and the selenium TMDL have been designed to protect or restore the beneficial uses of the LSJR, including fish and wildlife habitat.

Agricultural water conservation practices and out-of-basin water transfers greatly influence the quantity and quality of return flows to the LSJR. Water conservation practices involve a reduction in the amount of water applied to crops that makes water available for other uses (including expansion of crop acreage).

Implementation of water conservation practices results in decreased drainage returns. When water supplies are made available through water conservation it is also sometimes used as justification to transfer water to an out-of-basin use that removes water from the LSJR watershed. These out-of-basin water transfers usually involve an economic benefit to the water rights holder who relinquishes their rights to the transferred water. The proposed project may prompt dischargers to implement water conservation practices specifically to reduce drainage to comply with load allocations. A portion of the water made available through implementation of water conservation practices could be used to increase the assimilative capacity of the LSJR (increase flow) or for other environmental purposes. As part of the proposed project, the Regional Board would work with the State Water Board to ensure that out-of-basin water transfers do not have a deleterious effect on the LSJR and to the extent possible, identify and act on opportunities to provide increased flow to the LSJR.

Possible changes to water and drainage management practices applied to manage wetlands would likely have an effect on the management of federally protected wetlands. State, federal, and privately managed wetlands will need to adopt water management practices that may include changes in the timing of discharges of ponded wetland water. The mix of habitat types within wetland complexes may need to be changed to reflect changes in the timing of wetland draw down to meet load. Proposed changes to wetland operations or the construction of new facilities would be subject to a separate CEQA analysis by the appropriate lead agency.

V. Cultural Resources

Implementation of the proposed Basin Plan Amendment would not likely to affect cultural resources.

VI. Geology and Soils

Implementation of the proposed Basin Plan Amendment would not affect the geology of the region and would not expose people to additional geologic hazards. Water and drainage management practices implemented by agricultural dischargers to comply with the proposed regulation may, in fact, reduce soil erosion and loss of topsoil that is occurring in the project area.

VII. Hazards and Hazardous Materials

Implementation of the proposed Basin Plan Amendment would not create hazards or affect handling of hazardous materials.

VIII. Hydrology and Water Quality

The purpose of the proposed Basin Plan Amendment is implementation of a program to comply with existing water quality objectives through reduction and changes in timing of salt and boron loading to the San Joaquin River. It is anticipated that management practices employed by agricultural and wetland dischargers to comply with the proposed regulations would, in fact, result in improved water quality with regard to salinity and boron concentrations.

Implementation of the proposed Basin Plan Amendment is not likely to result in violation of water quality standards or waste discharge requirements or deplete groundwater supplies. Changes in the timing of discharges to the San Joaquin River by agricultural and wetland dischargers may alter existing flow patterns but they are unlikely to result in erosion, siltation, or flooding. Implementation of the proposed regulation is unlikely to affect stormwater drainage systems, provide additional sources of polluted runoff, substantially degrade water quality, have an effect on flood flows, or increase the chance of inundation by seiche, tsunami, or mudflow.

Management practices employed to comply with the proposed Basin Plan Amendment may occur at the farm, district, or basin-wide scale. Specific projects implemented to comply with the proposed regulation would need to be evaluated for its affects on hydrology and water quality by the implementing entity, as necessary.

Drainage re-use could potentially have an affect on groundwater resources. Operation of new drainage re-use facilities would likely result in increased percolation and groundwater recharge and therefore not adversely affect the production rate of any nearby wells. Drainage re-use, however, has the potential to adversely effect groundwater quality though surface water application and resulting percolation of high salinity drain water, and through leaching of minerals from the soil profile. Construction and use of evaporation ponds could have a similar impact on groundwater quality if they are not properly designed. Background information on groundwater resources in the LSJR watershed is given in Appendix A (Section 1.3 of the technical TMDL report). In general, Groundwater quality is poorer on the west side of the LSJR compared to the east side, and in many areas the groundwater currently exceed secondary drinking water MCLs for salinity.

The Grassland Subarea contains some of most salt-affected lands in the LSJR watershed. This subarea is also the largest contributor of salt to the LSJR (approximately 37% of the LSJR's mean annual salt load). Previous studies indicate that shallow groundwater in the LSJR watershed is of the poorest quality (highest salinity) in the Grassland Subarea (SJVDP, 1990). As mentioned above , the USBR has a legal obligation to provide drainage GDA. The USBR's San Luis Drainage Feature Re-evaluation Plan Formulation Report (2002) indicates that their In-valley Disposal Alternative (which calls for drainage reduction through

re-use and other means) would “... *have a beneficial impact on groundwater salinity relative to the no-action alternative*” (cessation of drainage by 2010). Additionally, an existing TMDL for selenium and its implementing WDR establishes progressively stricter load limits for drainers in the GDA. Therefore, drainage re-use and evaporation facilities in some form, will likely be used by dischargers, in cooperation with the USBR, to address ongoing drainage issues in the Grassland Subarea independent of this Basin Plan Amendment.

Potential impacts to groundwater quality have been minimized by selecting the implementation alternative that allows the maximum amount of drainage to be discharged to the river, thereby reducing the amount of drainage that needs to be re-used or evaporated. Additional mitigation can be incorporated into the design of re-use facilities to minimize or eliminate potential impacts to groundwater quality. Placement of shallow tile drains, for example, below re-use facilities can be used to intercept and isolate high percolating drainage before reaching underlying aquifers. Any evaporation and re-use facilities constructed to comply with proposed regulation would be designed and permitted to minimize impacts on groundwater resources. The proposed regulation does not authorize the construction of any new re-use or evaporation facilities and any such projects would be subject to a separate CEQA analysis by the appropriate lead agency. The proposed Basin Plan Amendment would therefore not have a substantial impact on groundwater quality.

IX. Land Use and Planning

Implementation of the proposed Basin Plan Amendment should not result in any changes in land use or planning (see section II above for discussion of Agricultural Resources).

X. Mineral Resources

Implementation of the proposed Basin Plan Amendment should have no effect on mineral resources.

XI. Noise

Agricultural and wetland dischargers would likely make changes to their water and drainage management practices to comply with the proposed regulations. These practices, such as those described in Appendix 2 should not lead to any increase in exposure to noise

XII. Population and Housing

Implementation of the proposed Basin Plan Amendment would not directly or indirectly induce population growth in the area, displace existing housing, or displace people.

XII. Public Services

The proposed Basin Plan Amendment would not have an impact on public services.

XIV. Recreation

There should be no increase in use of parks or recreational facilities or the need for new or expanded recreational facilities as a result of this proposed Basin Plan Amendment.

XV. Transportation/Traffic

The proposed Basin Plan Amendment would not have an impact on transportation or traffic.

XVI. Utilities and Service Systems

The proposed Basin Plan Amendment includes limits on loads of salt and boron from wastewater treatment plants. Load limits from wastewater treatment plants are set at current loading rates so the proposed regulation would not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities. Agricultural and wetland dischargers, in order to comply with the proposed regulations, may chose to treat or dispose of drainage water. Agricultural and wetland dischargers would be responsible for the construction and assessment of the environmental impacts of any treatment systems.

XVII. Mandatory Findings of Significance

The purpose of the proposed Basin Plan Amendment is to implement existing water quality objectives through load reductions and changes in timing of discharge of salt and boron. Implementation of the proposed Basin Plan Amendment would therefore likely result in improved quality of the environment with respect to reduced salt and boron concentrations in the San Joaquin River. Future Basin Plan Amendments will establish new water quality objectives for salt and boron, at which time additional salt and boron load reductions will be required. Other Basin Plan Amendments will likely establish new water quality objectives for other pollutants such as pesticides and other control programs to comply with new or existing objectives. The cumulative impacts of these additional regulations will be evaluated at the time of these future Basin Plan Amendments.

STATEMENT OF OVERRIDING CONSIDERATION

A statement of overriding considerations must be made when an agency approves a project that will result in significant impacts. The statement of overriding considerations justifies why the agency is approving the project even though significant impacts have been identified (CEQA Guidelines Section 1603).

The environmental analysis contained in this Basin Plan Amendment staff report and the Environmental Checklist contained therein does not identify any direct significant impacts of the proposed project on the environment.

7 Public Participation and Agency Consultation

A technical TMDL report was released for public review in January 2002 and staff solicited informal comments from the public and affected agencies at that time. Regional Board staff also held a series four workshops to inform the public and interested parties of the status of the salt and boron TMDL. The workshops included initial outreach to inform stakeholders that this TMDL was being started, and continuous updates were conducted to explain the methods and assumptions used to develop the TMDL. These workshops were held to seek public input regarding the development of the TMDL. Accordingly, the salt and boron technical TMDL was revised several times, prior to its January 2002 release, to address public concerns or incorporate ideas that were suggested at public workshop or in written comments.

Summary of Public Workshops for the San Joaquin River Salt and Boron TMDL

Date	Workshop Subject
August 2000	Initial Outreach for Salt and Boron TMDL
March 2001	Initial Outreach and Overview of the Salt and Boron TMDL
August 2001	Problem Statement, Source Analysis
March 2002	Draft TMDL Report - Loading Capacity Method, Load Allocations, and Waste Load Allocations
September 2003	Implementation Framework

A Regional Board workshop is planned during the Basin Planning phase of TMDL development to provide additional opportunity for public input. A revised technical TMDL report will be released to the public along with this staff report in October 2003. A formal 30-day comment period on the technical TMDL and the implementing Basin Plan amendment will be provided prior to Regional Board consideration of the amendment. The Regional Board will ultimately need to consider adoption of the proposed Basin Plan amendment during a separate public hearing thus, providing another opportunity for public comment.

With regard to agency consultation the State Water Boards CEQA (23 CFR 3778) regulations state that:

Upon completion of the written report, the board shall consult with other public agencies having jurisdiction by law with respect to the proposed activity and should consult with persons having special expertise with regard to the environmental effects involved in the proposed activity. The board may consult with such persons by transmitting a copy of the written report or by other appropriate means.

Agency consultation shall occur when this staff report is circulated for public review and comment. A written response to any comments containing significant environmental points raised during the evaluation process will be prepared and made available to the public pursuant to the regulations at 23 CFR 3779.

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